



[What's new](#) [Guestbook](#) [Bibliography](#) [Authors](#) [Editor's corner](#) [Our Banners](#) [Links](#)  [In Russian](#)

WEBMASTERS ATTENTION!

We're proud to inform we've launched a new project Historical Links Catalogue! If you have a historical website you can add your link right now! [Click here to begin!](#)

Search This Website

Search Soldier's Accounts

AFVs SPECIFICATION

[Soviet production tanks](#)

[Soviet production SP
guns](#)

[Soviet experimental
vehicles](#)

TANK MACHINE- GUNS

7.62mm DT Model 1929

12.7mm DShK Model
1938

12.7mm DS Model 1939

SMALL CALIBRE TANK GUNS

[20mm TNSh](#)

[23mm VYa](#)

[23mm PT-23TB](#)

[37mm Hotchkiss \(PS-1\)](#)

37mm PS-2

37mm B-3

SOVIET LIGHT TANKS

Russian Renault

T-18 (MS-1)

- [development history](#)

- [in action](#)

- [construction features](#)

- modifications

- T-18 in museums

[The Christie Tank in the USSR](#)

[BT-2](#)

[BT-5](#)

- [interior](#)

[BT-7](#)

- [interior](#)

[T-26](#)

- modifications

- [interior](#)

OT-26

[T-27](#)

T-37

T-38

[T-40](#)

[T-50](#)

MAIN MENU

SOLDIERS AT WAR

ARCHIVAL STUFF

BOOKSHELF

TANK DEVELOPMENT

ARTILLERY

BATTLES

LEND-LEASE AID

PRESERVED IN MUSEUMS

MILITARY FORUM



37mm ZIS-19

45mm TANK GUNS

[45mm 20K](#)

[45mm VT-42/43](#)

45mm ZIS-19BM

57mm TANK GUNS

57mm ZIS-4

76mm TANK GUNS

76mm KT

76mm PS-3

76mm L-10

76mm L-11

76mm F-27

76mm F-32

76mm F-34

76mm S-54

76mm ZIS-5

85mm TANK GUNS

85mm D-5

[85mm S-18](#)

[85mm S-31](#)

85mm S-50

85mm S-53 and ZIS-S-53

85mm F-30

85mm F-39

85mm LB-1

100mm TANK GUNS

[100mm D-10](#)

100mm S-34

100mm ZIS-100

100mm LB-1

107mm TANK GUNS

107mm ZIS-6

122mm TANK GUNS

[T-60](#)

- [in action](#)

- [conversions](#)

T-70/T-80

SOVIET MEDIUM TANKS

[T-24](#)

[T-28](#)

- [interior](#)

T-34

- [prototypes of the T-34](#)

- [T-34-76 development history](#)

- [T-34-76 in action](#)

- [construction features](#)

- [T-34-76 interior](#)

- [T-34 profiles](#)

- [T-34-57](#)

- [T-34-85 development history](#)

- [T-34-85 in action](#)

- OT-34

[T-44](#)

SOVIET ARMORED CARS

D-8

[FAI](#)

[BA-I, BA-3, BA-6, BA-9](#)

BA-10

BA-20

[BA-64](#)

- [modifications](#)

SOVIET HEAVY TANKS

[T-35](#)

- [the location and duties for the crew](#)

- [interior](#)

[KV-1](#)

- [interior](#)

[KV-1S](#)

[KV-2](#)

[KV-8/KV-8S](#)

[KV-85](#)

122mm U-11
122mm M-30
122mm D-25 (A-19)
122mm D-30
122mm S-34-II

152mm TANK GUNS

152mm M-10
152mm ML-20
152mm S-41

[JS-1/JS-2](#)

- [development history](#)
- [in action](#)
- [comparing with German tanks](#)
- [interior of the JS-1](#)
- [interior of the JS-2](#)
- [Detailed interior top view](#)
- [Detailed interior bottom view](#)

[JS-3](#)

[Last Soviet Heavy Tanks](#)

SOVIET SELF-PROPELLED GUNS

[ZIS-30](#)

[SU-76](#)

[SU-76i](#) **UPDATE**

[SU-85](#)

[SU-100](#)

[SU-122](#)

[SG-122\(A\)](#)

[SU-152](#)

[JSU-122/JSU-152](#)

- [Post-war usage of JSU](#)

SOVIET TRUCKS AND TRACTORS

First Soviet tractors

["Komintern"](#)

"Voroshilovets"

"Komsomolets"

ZIS-5

ZIS-42

GAZ-64

GAZ-67

EXPERIMENTAL VEHICLES

[PPG tankette](#)

[T-17 Tankette](#)

T-19

[T-21 and T-23 Tankettes](#)

T-29

[Tank Grote](#)

[Russian 'Hetzer'](#)

[T-34M](#)

[T-34-100](#)

[T-43](#)

[KV-3, KV-4, KV-5, KV-7, KV-9, KV-220](#)

[SMK](#)

T-100

[SU-100Y Self-Propelled Gun](#)

[SU-101, SU-102](#)

Current section is maintained by [Valeriy Potapov](#)

This page belongs to [The Russian Battlefield](#)



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[Àððèâ ñâîñðáé](#)

ARCHIVAL STUFF section is updated!

19-03-2002 01:56:40

There are new six documents from ex-Soviet archives in the [ARCHIVAL STUFF](#) section

TANK DEVELOPMENT section is updated

18-03-2002 17:10:02

New descriptions for 45mm tank guns are added: [45mm Tank Gun Model 1932/38](#) and [45mm Tank Guns VT-42/VT-43](#)

TANK DEVELOPMENT section is updated

18-03-2002 16:41:04

A couple new articles about Soviet tankettes [T-17](#), [T-21](#) and [T-23](#).

BATTLES section is updated

18-03-2002 16:40:43

New article about [Tiraspol-Melitopol Defensive Operation](#)

I REMEMBER section is updated

10-02-2002 03:25:19

Memoirs of artilleryman [Aleksandr Alekseevich Goncharov](#) is now available.

BOOKSHELF section is updated

10-02-2002 03:19:52

New article about [Independent Special Purpose Motorized Brigade](#) is available.

I REMEMBER section is updated

10-02-2002 03:18:31

The story from [Nikolay Kolesnik](#) is now available.

BOOKSHELF section is updated

10-02-2002 03:16:40

New article about [Soviet snowmobiles](#) is available.

Website being re-organized

10-02-2002 03:15:12

Both [ARCHIVAL STUFF](#) and [BOOKSHELF](#) sections have been re-organized. The first contains now only unedited archival documents; the latter contains now only articles, reviews, and books.

BATTLES section is updated

10-02-2002 03:09:49

New article [The Fate of Amphibious Assault Tanks](#) supplied with [archival document](#) is now available.

TANK DEVELOPMENT section is updated

10-02-2002 03:07:05

New article about experimental [SU-100Y](#) self-propelled gun is now available.

TANK DEVELOPMENT section is updated

10-02-2002 03:06:18

The article about [SU-101 and SU-102](#) experimental self-propelled guns is updated. Completely new text and some new pictures are included!

BOOKSHELF section is updated

10-02-2002 03:04:21

John Salt's study [WWII Armour Penetration Performance Statistics](#) is now available.

TANK DEVELOPMENT section is updated

10-02-2002 03:02:14

New article about little-known Soviet projects of [Hetzer-like tank destroyers](#) is available.

TANK DEVELOPMENT section is updated

10-02-2002 03:00:40

Two articles about JS tanks are updated:

-[Development History](#)

-[Combat Employment](#)

The text is corrected; and photos are re-scanned and enlarged. Some new photos are added.

[Àðõèâ ïâîñðáé](#)

Bibliography

◀ [MAIN MENU](#) [SOLDIERS AT](#)
[WAR](#) [DOCUMENTS](#) [BATTLES](#) [TANKS](#) [ARTILLERY](#) ▶

Those are some of the sources used to make this website. It's not the full sources but rather a selection of the best of them. However, some of them can give opposite information, beware dear reader of the ambush...

[Archival documents and stuff](#)

[Memoirs](#)

[Technical issues](#)

[Periodical issues](#)



Authors and Credits

◀ [MAIN MENU](#) [SOLDIERS AT](#)
[WAR](#) [DOCUMENTS](#) [BATTLES](#) [TANKS](#) [ARTILLERY](#) ▶



VALERIY POTAPOV

Director

Born in Moscow. Graduated from the Digital Measurement Systems Department of the Moscow Technological University. Today I'm working as a leading designer at Interior Design Bureau. All my life I was interesting for history of Russia, particularly for history of the Great Patriotic War. I started this website in January 1998. My point was to share my knowledge and to introduce foreigners with the Russian history.

✉ battlefield#e-mail.ru (Please, don't send me letters in HTML format! My mail-server is adjusted to automatically delete such letters in order to protect me from hack-attacks. Send me letters in plain text format!)

✉ ICQ UIN 13638538



EUGENE BOLDYREV

Consultant: Tanks and SP-Guns.

Born in Moscow in 1970. Completed the Moscow State Academy of Laws. Today I'm working as a lawyer, in particular for intellectual property rights. I'm interesting in military history of Russia and scale-modelling (M 1:35). I joined this website in March 1998.

✉ serkof@corbina.ru (Please, write me in Russian only otherwise forward your letters to [Valeriy Potapov](#))



ARTEM DRABKIN

Maintains the SOLDIERS AT WAR section.

Born in Moscow in 1971. Graduated from the Biology and Chemistry Department of the Moscow Pedagogical University. Ph. D degree in Molecular Biology. Currently works a sales manager at Lytech (only in Russian) company. I conceived this project when I realized that I'm loosing connection with the generation that raised me, and thus became so dear and close.

✉ drabkin@dpidb.genebee.msu.ru

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The Editor's Corner

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[WAR](#) [DOCUMENTS](#) [BATTLES](#) [TANKS](#) [ARTILLERY](#) ▶



Valeriy Potapov

Dear friends!

We have made this page specially to explain some moments related to the Russian Battlefield



Eugene Boldyrev

website.

The Russian Battlefield was intended to give for non-Russian people an opportunity to read about Soviet tank development. We don't pretend to be all-embracing, rather to provide some basic knowledges. Such "pro-western" orientation of our website is affected on rare updates since we need to translate all Russian stuff in English. This takes too much time. Sometimes we receive messages from individuals who are not natively speaking English but pointed out our English isn't perfect. For such individuals we would like to say: if you are so smart why don't you help us? This would be much better then just to criticize our hard work.

Now lets talk about some specific subjects...

TOP-News!

Recently, our website has won the second place in the [RUSSIA ON WAR](#) competition!

At first, we continue our survey and we would like to assure you: your opinions are very important for us! If you have an opinion, you may fill out the form [right here](#). Also, you can check the preliminary results of this survey [here](#).

At second, since our website grows constantly we don't have enough time to publish all possible materials we already possess. We need your help! First of all we heed help in translating text from Russian in English. Because our website isn't commercial, we cannot pay money

for this, all we can do is to credit your work. If anybody want to help us, don't hesitate and write to [Valeriy Potapov](#)!

Perhaps, you don't want to make translations, but still want to help us. If you know HTML-code and you can create web-pages, you may help us, since we have enough unpublished materials. Write to [Valeriy Potapov](#)!

At third, another moment to be mentioned. We receive huge amount of letters from around the world. Trust us, we are trying to help everyone, but our possibilities are limited (unfortunately!) We will try to reply to you and help you, however it may take some time. So, please, be patient! Also, please don't think we are know everything. Some of your questions are hard to answer. Sometime we simply don't know the answer.

And finally we would like to say a couple words about the legal way of copying materials from our website. Actually, we have devoted a page about it, so please [check it out](#)!.

This page belongs to [The Russian Battlefield](#)



Our Banners and Buttons

◀ [MAIN MENU](#) [SOLDIERS AT](#)
[WAR](#) [DOCUMENTS](#) [BATTLES](#) [TANKS](#) [ARTILLERY](#) ▶▶

Dear friends!

If anybody want to add our banner on your own website, feel free to take any of these. We would be very thankful if you will add our banner on your website! To place a banner a banner, please take the HTML-code and insert it on your page. There is no need to copy a banner itself. Moreover, you'll be sure you always have our latest banner!



Description: Large banner;
Dimintions: 468x60 pixels;
Size: 8.5 Kb;

HTML-code:

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<!--THE RUSSIAN BATTLEFIELD-->
<CENTER>
<A HREF="http://www.battlefield.ru" TARGET="_top"><IMG
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ALT="The Russian Battlefield" BORDER="0"></A>
</CENTER>
<!--THE RUSSIAN BATTLEFIELD-->
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Size: 9.8 Kb;

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ALT="The Russian Battlefield" BORDER="0"></A>
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<!--THE RUSSIAN BATTLEFIELD-->
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Dimentions: 468x60 pixels;

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HTML-code:

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ALT="The Russian Battlefield" BORDER="0"></A>
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<!--THE RUSSIAN BATTLEFIELD-->
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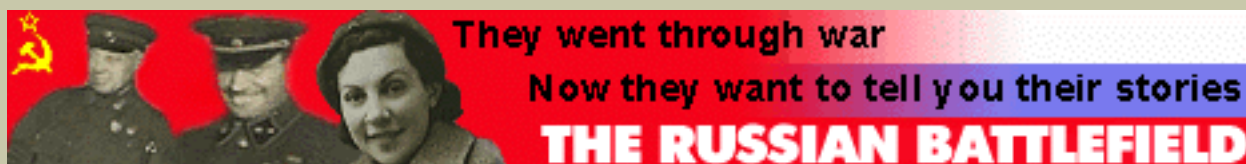
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Dimentions: 468x60 pixels;

Size: 13.7 Kb;

HTML-code:

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<!--THE RUSSIAN BATTLEFIELD-->
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Description: Large banner for the "Soldiers At War" section;

Dimentions: 468x60 pixels;

Size: 13.4 Kb;

HTML-code:

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<!--THE RUSSIAN BATTLEFIELD-->
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HTML-code:

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</CENTER>
<!--THE RUSSIAN BATTLEFIELD-->
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Description: Big button;

Dimentions: 100x100 pixels;

Size: 2.7 Kb;

HTML-code:

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<!--THE RUSSIAN BATTLEFIELD-->
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<!--THE RUSSIAN BATTLEFIELD-->
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Description: Big button;
Dimentions: 100x100 pixels;
Size: 4.4 Kb;
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Description: Big button for "Artillery" section;
Dimentions: 100x100 pixels;
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Size: 1.3 Kb;

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ALT="The Russian Battlefield" BORDER="0"></A>  
<!--THE RUSSIAN BATTLEFIELD-->
```

This page belongs to [The Russian Battlefield](http://www.battlefield.ru)



Links

◀ [MAIN MENU](#) [SOLDIERS AT](#)
[WAR](#) [DOCUMENTS](#) [BATTLES](#) [TANKS](#) [ARTILLERY](#) ▶

Here we had collected some links to informative resources which are represent an interesting and sometimes unique information.

You can add your link in our [Historical Links Catalogue](#).

MILITARY HISTORY

[RED STEEL](#)

Very interesting page dedicated to the Red Army. Our colleague! [\(English\)](#)

[TRACKS AND ARMOUR](#)

Here you may find out information about any division or corps. [\(English\)](#)

[ACHTUNG PANZER!](#)

Well done website dedicated to the history of the tanks and people of the Panzertruppe [\(English\)](#)

[ARMOUR AT PAROLA ARMOUR MUSEUM](#)

Virtual Finnish museum with many interesting color photos [\(Finnish/English\)](#)

[OPERATION BARBAROSSA](#)

Having an excellent design this site provide a very interesting and complex information about initial period of WWII [\(English\)](#)

[ARMOR INTERIORS](#)

Great resource, many interior photos and articles. Highly recommended! [\(English\)](#)

[WORLD WAR II ARMED FORCES](#)

Unofficial site dedicated to Orders of Battle and Organizations of the armed forces in World War II. Lots of useful stuff. [\(English\)](#)

[DAS REICH](#)

A military history page dedicated to the examination of the 2nd SS Panzer Division "Das Reich". Excellent website! [\(English\)](#)

[ARMOUR ARCHIVE](#)

The aim of Armour Archive is to track down and record the details of all preserved armoured vehicles around the world. [\(English\)](#)

[HISTORY RESOURCES OF WWW](#)

A large list of links of web sites related to Russian history. [\(Russian\)](#)

[THE WORLD AT WAR](#)

History of WW 1939-1945 [\(English\)](#)

[DIE GEBIRGSTRUPPEN](#)

Site dedicated to Gebirgsjager Mountain Troops during World War Two. [\(English\)](#)

VON REITSCH PANZER PAGE

The illustrated history of German panzers in World War II [\(English\)](#)

BALTIC AFVS & ARMORED TRAINS 1918-1940

AFVs and armored trains in service with Estonian, Latvian and Lithuanian armies between 1918 and 1940. [\(English/Swedish/Estonian\)](#)

TANKS!

Website devoted to armor and armored developement in less covered nations prior to 1946. [\(English\)](#)

GUNS VS ARMOUR 1939 TO 1945

Provides information on gun penetration, ammunition types and armour characteristics. Data is corrected to allow comparisons of weapons from different nations. [\(English\)](#)

THE 12 SS-PANZERDIVISION "HITLERJUGEND"

Covering all facets of the division, from operational history to commanders and high award winners. [\(English\)](#)

DIVING EAGLE

Airborne Operations and Ground Campaign's of the Luftwaffe Fallschirmjager 1940-1945. [\(English\)](#)

RUSSIAN WEAPONS AND MILITARY TECHNOLOGIES

The stuff of this website is based on materials from military exhibition VTTV-Omsk-99. [\(English/Russian\)](#)

WORLD WAR 2 IN YUGOSLAVIA

Covering Yugoslavia during World War 2 from invasion and occupation to liberation and armies involved, weapons and equipment in use. [\(English\)](#)

BATTLES OF THE WINTER WAR

General and detailed information of the Finnish - Soviet Winter War 1939-1940. [\(English\)](#)

POLISH ARMOUR 1918-39

Polish armour of 1918-1939, vehicles, armoured trains, their combat use, formations and other stuff, with a mass of pictures. [\(English/Polish\)](#)

SOVIET UNION FACTBOOK

Information on various aspects of the USSR with focus on the Great Patriotic War. [\(English\)](#)

MANNERHEIM LINE

Description of Finnish Main Defensive Line, that became known to the world during Winter War as Mannerheim Line. History of construction, modernisation and role of the Line in Winter War. [\(English/Russian\)](#)

REENACTMENT WEBSITES

RED GUARDS HOME OF THE 49TH GUARDS REENACTMENT CLUB CHS

A small group of individuals have come together to remember those men and women who fought in that Great Patriotic War. We seek to preserve their spirit and memories, not only

their uniforms, their awards, their weapons or their vehicles. We come from all ranks and levels of status to form a unit that will keep the flame of their sacrifices, burning bright.

(English)

THE NORTH FRONT

Society of WWII reenactment, that includes Red Army and Finnish Army clubs.

(English/Russian)

WARGAMES AND SCALE-MODELLING

PANZER GENERAL 2 ARMORY

Here you will find anything about PG 2 wargame. (English)

ROAD TO MOSCOW

Anything about this new wargame: screenshots, design, forum, history articles. (English)

THE PANZER GENERAL ZERSTORER

Another excellent website about Panzer General game. (English)

THE PANZER PAGE

Tips, scenarios, campaigns and other useful stuff related to Panzer General-2 game.

(English)

ACHTUNG! PANZER - The Homepage of the Washington Armor Club

The Washington Armor Club is a collection of guys in the Washington, D.C., Northern Virginia, and Maryland, plus one transplant in St. Louis area who love to build armor models and study armored warfare. (English)

MODEL TANK GALLERY

If you are interested for scale-modelling - visit it! (English)

WAR IS OVER

This website devoted to wargames and related stuff! Pathces, editors etc.

(English/Russian)

OFFICER'S CLUB

Military-historic information of many topics like WWII, WWI, German-French war 1870, etc. Historic wargames played by teams. (English)

THE FRONT LINE BUNKER

Tactics, after action reviews, scenarios, opponents registry, and news for Talonsoft's East Front II simulation. (English)

HENK OF HOLLAND

Henk Timmerman from the Netherlands shows his Military Mastermodels from the period WWII scale 1/76 and 1/72, he made for several manufactures so as Ostmodels Australia, Milicast Scotland, FCM Germany, MGM Germany and others. The site has also interesting information from AFV's from WWII nations and becomes regular updates. (English)

ARMORAMA.COM

Armorama.com is an interactive community site for military scale modelers. Armor, aircraft, and warships. (English)

FIRE AND FURY

Fire and Fury Games Battlefront: World War Two wargame minatures rules. (English)





[📰 Новости](#)
[📖 Гостевая книга](#)
[📚 Библиография](#)
[✉ Авторы](#)
[🔪 Уголок редактора](#)
[✂ Баннеры](#)
[🌟 Ссылки](#)
[🇬🇧 In English](#)

ΑΙΕΙΔΕΡ ΑΑΙΑΝΟΑΔΑ!

Ιούδαυ πλάυεδου, +οί ιού οίεουί +οί γαίονδεέε ίαθ ίαύε ίοίάεο Historical Links Catalogue! Οάιρδου
 έααυέ έααυέ ίαααααέυ πδαιέ+εε ία έπιδε+άθεορ οάιό ίααό αίααεοδύ ηάιρ ηπύεεο! [Αίε γάαηύ!](#)

ΟΑΕΟΕΕΙ- ΟΑΘΙΕ×ΑΝΕΕΑ ΟΑΔΑΕΟΑΔΕΝΟΕΕΕ

[Νάδεείυά οάιέε](#)

[Νάδεείυά ΝΑΟ](#)

[Υέηιάδεείυά οάιέε](#)

ΟΑΙΕΙΑΥΑ ΙΟΕΑΙΑΟΥ

7,62-ιι ΑΟ ίαδ.1929

12,7-ιι ΑΘΕ ίαδ.1938

12,7-ιι ΑΝ ίαδ.1939

ΙΑΕΙΕΑΕΕΑΑΔΙΥΑ ΟΑΙΕΙΑΥΑ ΙΟΘΕΕ

20-ιι ΟΙΘ

23-ιι ΑΒ

23-ιι ΙΟ-23ΟΑ

37-ιι Αί÷έεηά (ΙΝ-1)

37-ιι ΙΝ-2

37-ιι Α-3

37-ιι ÇÈÑ-19

45-ιι ΟΑΙΕΙΑΥΑ ΙΟΘΕΕ

45-ιι 20Ε

45-ιι ΑΟ-42/43

45-ιι ÇÈÑ-19ΑΙ

ΕΑΑΕΕΑ ΟΑΙΕΕ

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Specifications of the Soviet AFVs

Production Light Tanks

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AFV designation	AFV name	Weight, kg	Crew	Dimensions, m	Clearance, m	Armament	Ammunition	Speed		Obstacles					Ground pressure, kg/cm²	Max. range, km	Engine				Radio	Internal communic.
								On road, km/h	Off road¹, km/h	gradient, degr.	side gradient, degr.	trench, m	vertical wall, m	fording depth, m			index	type	cylinders	power, hp		
Russian "Renault"	light tank	6 600	2	5x1.74x 2.25	0.435	37 mm Hochkis gun or 37 mm PS-1 gun, 8 mm Hochkis TMG	?	7.5	?	45°	30°	2	0.6	0.7	?	60	AMO	petrol	4	33.5	n/a	n/a
T-18 (1927)	light tank	5 300	2	4.4x1.76x2.1	0.315	37 mm Hochkis gun or 37 mm PS-1 gun, 6.5 mm Fedorov's TMG	37 mm: 97, 6.5 mm: 1800	14.7	?	40°	30°	1.7	0.5	0.8	0.37	120	Special tank engine by A.Mikulin	petrol	4	35	n/a	n/a
T-18 (1930)	light tank	5 680	2	4.35x1.76x2.12	0.315	37 mm Hochkis gun or 37 mm PS-1 gun, 7.62 mm DT TMG	37 mm: 104, 6.5 mm: 2016	17.5	?	40°	30°	1.7	0.55	0.8	0.375	120	Special tank engine by A.Mikulin	petrol	4	40	n/a	n/a
T-18M	light tank	5 800	2	3.52x1.75x2.08	0.3	37 mm Hochkis gun or 37 mm PS-1 gun, 7.62 mm DT TMG	37 mm: 112, 6.5 mm: 1449	24.3	?	40°	30°	1.7	0.55	1	0.37	?	GAZ M-1	petrol	4	50	n/a	n/a
T-27	light tankette	2 700	2	2.6x1.83x1.44	0.24	1x7.62 mm DT TMG	2520	42	?	30°	?	1.2	0.5	0.5	?	110	Ford-AA or GAZ-AA	petrol	4	40	n/a	n/a
T-37	light amphibious tank	2 900	2	3.3x1.9x1.74	0.285	7.62 mm DT TMG	2140	36	15	35°	35°	1.4	0.5	amphib, 4 km/h	0.45	200	GAZ-AA	petrol	4	40	n/a	n/a
T-37A	light amphibious tank	3 200	2	3.73x1.94x1.84	0.285	7.62 mm DT TMG	2140	36	15	35°	35°	1.4	0.5	amphib, 4 km/h	0.55	200	GAZ-AA	petrol	4	40	n/a	phone
OT-37	light amphibious flamethrower tank	3 200	2	3.73x1.94x 1.84	0.285	KS-1 flamethrower², 7.62 mm DT TMG	KS-1: 18, 7.62 mm: 2140	40	10-12	35°	35°	1.4	0.5	amphib, 6 km/h	0.55	200	GAZ-AA	petrol	4	40	n/a	phone
T-26 (1931-33)	light tank	8 400	3	4.62x2.44x2.19	0.38	2 x 7.62 DT TMG	6489	38	15	32°	40°	2	0.75	0.82	0.7	170	T-26	petrol	4	90	n/a	n/a
T-26 (1933-38)	light tank	9 400	3	4.62x2.44x2.24	0.38	45 mm gun 20K model 1932/38, 1 x 7.62 mm DT TMG, 1 x 7.62 mm DT CMG	45 mm: 147 (107)³, 7.62 mm: 3087	35	15	40°	40°	2	0.75	0.82	0.69	170	T-26	petrol	4	90	71-TK-1 or 71-TK-3	TPU-3R
T-26 (1935-39)	light tank	10 280	3	4.62x2.44x2.33	0.38	45 mm gun 20K model 1932/38, 1 x 7.62 mm DT TMG, 1 x 7.62 mm DT CMG, 1 x 7.62 mm DT RMG	45 mm: 205 (165)³, 7.62 mm: 3654 (3213)³	30	18	40°	40°	2.65	0.75	0.8	0.7	170	T-26	petrol	4	90	71-TK-1 or 71-TK-3	TPU-3R
OT-130	light flamethrower tank	10 000	3	4.65x2.44x2.33	0.38	KS-25⁴ flamethrower, 1 x 7.62 mm DT TMG	KS-25: 31 shots 7.62 mm: 3150	30	18	40°	40°	2.65	0.75	0.8	0.7	170	T-26	petrol	4	90	n/a	TPU-3
OT-134	light flamethrower tank	10 730	3	4.65x2.44x2.33	0.38	45 mm gun 20K model 1932/38, KS-25⁵ flamethrower, 1 x 7.62 mm DT TMG 1 x 7.62 mm DT AAMG	45 mm: 145, KS-25: 18 shots 7.62 mm: 3150	30	18	40°	40°	2.65	0.75	0.8	0.7	170	T-26	petrol	4	90	n/a	TPU-3
OT-26	light flamethrower tank	9 000	2	4.65x2.44x2.33	0.38	KS-24⁶ flamethrower, 1 x 7.62 mm DT TMG	KS-24: 70 shots 7.62 mm: 1512	38	15	32°	40°	2	0.75	0.82	0.7	170	T-26	petrol	4	90	n/a	n/a
BT-2	light wheeled-tracked tank	11 000	2	5.5x2.23x2.17	0.35	2 x 7.62 mm DT TMG	6432	51.6 (76)⁶	22	32° (15°)⁷	30°	2.25	0.55	0.85	0.59⁸	160	M5-400	petrol	12	365	n/a	n/a
BT-2	light wheeled-tracked tank	11 000	2	5.5x2.23x2.17	0.35	3 x 7.62 mm DT TMG	6432	51.6 (76)⁶	22	32° (15°)⁷	30°	2.25	0.55	0.85	0.59⁸	160	M5-400	petrol	12	365	n/a	n/a
BT-2	light wheeled-tracked tank	11 000	2	5.5x2.23x2.17	0.35	37 mm B-3 gun	92	51.6 (76)⁶	22	32° (15°)⁷	30°	2.25	0.55	0.85	0.59⁸	160	M5-400	petrol	12	365	n/a	n/a
BT-2	light wheeled-tracked tank	11 000	2	5.5x2.23x2.17	0.35	37 mm B-3 gun, 1 x 7.62 mm DT CMG	37 mm: 6432, 7.62 mm: 2709	51.6 (76)⁶	22	32° (15°)⁷	30°	2.25	0.55	0.85	0.59⁸	160	M5-400	petrol	12	365	n/a	n/a
BT-5	light wheeled-tracked tank	11 900	3	5.8x2.23x2.24	0.35	45 mm gun 20K model 1932/38, 1 x 7.62 mm DT CMG	45 mm: 115 (72)³, 7.62 mm: 2709	53 (72)⁷	20	37° (15°)⁷	30°	2.39	0.8	0.85	0.65⁸	160	M5	petrol	12	365	71-TK-3	TPU-3
BT-7	light wheeled-tracked tank	13 800	3	5.66x2.23x2.42	0.39	45 mm gun 20K model 1932/38, 1 x 7.62 mm DT CMG, 1 x 7.62 mm DT RMG	45 mm: 172 (132)³, 2394 (1953)³	50 (72)⁷	34.6	37° (15°)⁷	30°	2	0.8	0.9	0.85⁸	160	M-17T	petrol	12	450	71-TK-3	TPU-3
BT-7M	light wheeled-tracked tank	14 650	3	5.66x2.29x2.45	0.39	45 mm gun 20K model 1932/34, 1 x 7.62 mm DT CMG, 1 x 7.62 mm DT RMG	45 mm: 188 (146)³, 2331 (1827)³	62 (86)⁷	31.7	36° (15°)⁷	30°	2.5	0.75	1.2	0.9⁸	520	V-2	diesel	12	500	71-TK-3	TPU-3R
BT-7A	light wheeled-tracked artillery tank	13 800	3	5.66x2.23x2.42	0.39	76.2 mm KT gun, 1 x 7.62 mm DT CMG, 1 x 7.62 mm DT RMG, 1 x 7.62 DT AAMG	76.2 mm: 50 (40)³, 2394 (1953)³	50 (72)⁷	34.6	37° (15°)⁷	30°	2	0.8	0.9	0.85⁸	160	M-17T	petrol	12	450	71-TK-3	TPU-3
OT-7	light wheeled-tracked flamethrower tank	5 130	3	5.66x2.29x2.45	0.39	KS-63 flamethrower⁹, 45 mm gun 20K model 1932/38, 1 x 7.62 mm DT CMG, 1 x 7.62 mm DT RMG	KS-63: 15 shots, 45 mm: 172 (132)³, 2394 (1953)³	62 (86)⁶	28	36° (15°)⁷	30°	2.5	0.75	1.2	0.9⁸	520	V-2	diesel	12	500	71-TK-3	TPU-3

Specification of Soviet tanks

T-30	<i>light tank</i>	5 500	2	4.11x2.33x1.91	0.3	20 mm TNSh-20 gun, 1 x 7.62 mm DT CMG	20 mm: 750, 7.62 mm: 1512	45	20	30°	26°	1.6	0.6	0.9	0.46	300	GAZ-11	petrol	6	85	n/a	n/a
T-40	<i>light amphibious tank</i>	5 500	2	4.11x2.33x1.91	0.3	12.7 mm DShK HMG, 1 x 7.62 mm DT CMG	12.7 mm: 500, 7.62 mm: 2016	45	20	30°	26°	1.6	0.6	amphib, 6 km/h	0.46	300	GAZ-11	petrol	6	85	n/a	n/a
T-50	<i>light tank</i>	14 000	4	5.3x2.47x2.17	0.35	45 mm gun 20K model 1932/38, 1 x 7.62 mm DT CMG	45 mm: 150, 7.62 mm: 4000	52	24.8	45°	45°	2.2	0.7	1.1	0.57	245	V-4	diesel	6	300	9R	TPU-3
T-60	<i>light tank</i>	6 400	2	4.1x2.3x1.75	0.3	20 mm TNSh-20 gun, 1 x 7.62 DT CMG	20 mm: 780, 7.62 mm: 945	44	20	26°	35°	1.7	0.65	0.9	0.485	350	GAZ-202	petrol	6	76	n/a	n/a
T-70	<i>light tank</i>	10 000	2	4.42x2.47x2.03	0.3	45 mm gun 20K model 1932/38, 1 x 7.62 mm DT CMG	45 mm: 70, 7.62 mm: 945	45	24	28°	30°	1.6	0.6	0.9	0.53	190	2 x GAZ- 70-6000	petrol	6	2 x 70	n/a	TPU-7
T-80	<i>light tank</i>	11 600	3	4.42x2.5x2.18	0.3	45 mm gun 20K model 1932/38, 1 x 7.62 mm DT CMG	45 mm: 94, 7.62 mm: 1008	47	21	28°	24°	1.8	0.6	0.9	0.77	230	2 x GAZ- 11	petrol	6	2 x 85	12RT	n/a

Production Medium Tanks

AFV designation	AFV name	Weight, kg	Crew	Dimensions, m	Clearance, m	Armament	Ammunition	Speed		Obstacles				Ground pressure, kg / cm ²	Max. range, km	Engine				Radio	Internal communic.	
								On road, km / h	Off road ¹ , km / h	gradient, degr.	side gradient, degr.	trench, m	vertical wall, m			fording, m	index	type	cylinders			power, hp
T-24	medium tank	17 800	5	6.5x2.81x3.04	0.5	45 mm gun model 1930, 2 x 7.62 mm DT TMG, 1 x 7.62 mm DT CMG, 1 x 7.62 mm DT BMG	45 mm: 89, 7.62 mm: 8000	22.5	?	40°	30°	2.6	0.745	?	0.46	140	M-6	petrol	8	200	n/a	n/a
T-28	medium tank	27 800	6	7.44x2.81x2.82	0.56	76.2 mm KT-28 gun, 2 x 7.62 mm DT TMG, 1 x 7.62 mm DT BMG, 1 x 7.62 mm DT CMG, 1 x 7.62 mm DT AAMG	76.2 mm: 70, 7.62 mm: 7938	45	20	45°	30°	3.5	1	1	0.72	220	M-17T	petrol	12	500	71-TK-1 or 71-TK-3	TPU
T-29	medium tank	24 000	5	6.53x3.06x2.85	0.45	76.2 mm KT gun, 2 x 7.62 mm DT TMG, 1 x 7.62 mm DT BMG, 1 x 7.62 mm DT CMG, 1 x 7.62 mm DT RMG	76.2 mm: 78, 7.62 mm: 6930	54 (81) ⁷	30	35°	15°	3	0.85	1.1	0.59 ⁸	200	M-17B	petrol	12	500	71-TK	TPU
T-34-57	tank destroyer	30 900	4	6.1x3x2.4	0.4	57 mm ZIS-4 gun or 57 mm ZIS-4M gun, 1 x 7.62 mm DT CMG, 1 x 7.62 mm DT BMG	57 mm: ?, 7.62 mm: 2898 (3150) ¹⁰	55	25	35°	25°	2.5	0.73	1.3	0.72	250	V-2-34	diesel	12	500	71-TK-3 or 9R or 9RM	TPU-2 or TPU-3 or TPU-3bisF
T-34-76	medium tank	30 900	4	6.1x3x2.4	0.4	76.2 mm L-11 gun or 76.2 mm F-34 gun, 1 x 7.62 mm DT CMG, 1 x 7.62 mm DT BMG	76.2 mm: 77 (100) ¹⁰ , 7.62 mm: 2898 (3150) ¹⁰	55	25	35°	25°	2.5	0.73	1.3	0.72	250	V-2-34 (some tanks - with the gasoline M-17T)	diesel	12	500	71-TK-3 or 9R or 9RM	TPU-2 or TPU-3 or TPU-3bisF
TO-34	medium flamethrower tank	30 900	4	6.1x3x2.4	0.4	ATO-41 ¹¹ or ATO-42 ¹² flamethrower, 76.2 mm F-34 gun, 1 x 7.62 mm DT CMG	ATO-41: 10, ATO-42: 20, 76.2 mm: 77, 7.62 mm: 2750	55	25	35°	25°	2.5	0.73	1.3	0.72	250	V-2-34	diesel	12	500	9RM or 9RS	TPU-3bisF
T-34-85	medium tank	32 000	5	8.15x3x2.7	0.4	85 mm D-5T gun or 85 mm S-53 gun or 85 mm ZIS-S-53 gun, 1 x 7.62 mm DT CMG, 1 x 7.62 mm DT BMG	85 mm: 55, 7.62 mm: 1827	55	25	35°	25°	2.5	0.73	1.3	0.85	250	V-2-34	diesel	12	500	9RM or 9RS	TPU-3bisF
TO-34-85	medium flamethrower tank	32 000	5	8.15x3x2.7	0.4	ATO-42 ¹² flamethrower, 85 mm ZIS-S-53 gun, 1 x 7.62 mm DT CMG	ATO-42: 20, 85 mm: 55, 7.62 mm: 1827	55	25	35°	25°	2.5	0.73	1.3	0.83	250	V-2-34	diesel	12	500	9RM or 9RS	TPU-3bisF

Production Heavy Tanks

AFV designation	AFV name	Weight, kg	Crew	Dimensions, m	Clearance, m	Armament	Ammunition	Speed		Obstacles					Ground pressure, kg/cm²	Max. range, km	Engine				Radio	Internal communic.
								On road, km/h	Off road¹, km/h	gradient, degr.	side gradient, degr.	trench, m	vertical wall, m	fording, m			index	type	cylinders	power, hp		
T-35A	heavy tank	50 000	11	9.72x3.2x3.43	0.53	1 x 76.2 mm KT gun, 2 x 45 mm gun 20K model 1932/38, 2 x 7.62 mm DT TMG, 3 x 7.62 mm DT CMG, 1 x 7.62 mm DT RMG	76.2 mm: 96, 7.62 mm: 10080	30	20	30°	15°	5	1.2	1.7	0.78	120	M-17T	petrol	12	500	71-TK-1 or 71-TK-3	TPU-7
KV-1	heavy tank	47 500	5	6.9x3.32x2.71	0.45	76.2 mm F-32 gun or 76.2 mm ZIS-5 gun, 1 x 7.62 mm DT CMG, 1 x 7.62 mm DT BMG, 1 x 7.62 mm DT RMG	76.2 mm: 114, 7.62 mm: 3000	35	16	36°	30°	2.7	1.2	1.6	0.77	180	V-2K	diesel	12	600	10R	TP-4-Bis
KV-8	heavy flamethrower tank	46 000	5	6.9x3.32x2.71	0.45	ATO-41¹³ flamethrower, 45 mm gun 20K model 1932/38, 1 x 7.62 mm DT BMG, 1 x 7.62 mm DT RMG	ATO-41: 60, 76.2 mm: 88, 7.62 mm: 2400	35	16	36°	30°	2.7	1.2	1.6	0.77	180	V-2K	diesel	12	600	9R or 10R	TP-4
KV-2	heavy assault tank	52 000	6	6.95x3.32x3.25	0.407	152.4 mm M-10 howitzer, 1 x 7.62 mm DT BMG, 1 x 7.62 mm DT RMG	152.4 mm: 36, 7.62 mm: 2475	35	16	36°	30°	2.7	1.2	1.6	0.84	140	V-2K	diesel	12	600	71-TK-3	TPU-4R

Specification of Soviet tanks

KV-1S	<i>heavy tank</i>	42 500	5	6.9x3.35x2.64	0.45	76.2 mm ZIS-5 gun, 1 x 7.62 mm DT CMG, 1 x 7.62 mm DT BMG, 1 x 7.62 mm DT RMG	76.2 mm: 114, 7.62 mm: 3000	43	18	36°	30°	2.7	1.2	1.6	0.8	160	V-2K	diesel	12	600	10R	TP-3-BisF
KV-8S	<i>heavy flamethrower tank</i>	43 000	5	6.9x3.35x2.64	0.45	ATO-42 ¹⁴ flamethrower, 45 mm gun 20K model 1932/38, 1 x 7.62 mm DT BMG, 1 x 7.62 mm DT RMG	ATO-42: 60, 76.2 mm: 114, 7.62 mm: 2400	43	18	36°	30°	2.7	1.2	1.6	0.8	160	V-2K	diesel	12	600	10R	TP-3-BisF
KV-8S	<i>heavy tank</i>	46 000	4	6.9x3.25x2.83	0.45	85 mm D-5T gun, 1 x 7.62 mm DT CMG, 1 x 7.62 mm DT BMG, 1 x 7.62 mm DT RMG	85 mm: 70, 7.62 mm: 3276	34	16	40°	30°	2.7	1.2	1.6	0.8	180	V-2K	diesel	12	600	9R or 10R	TPU-4-BisF
IS-1 (IS-85)	<i>heavy breakthrough tank</i>	44 160	4	8.56x3.07x2.74	0.465	85 mm D-5T gun, 1 x 7.62 mm DT CMG, 1 x 7.62 mm DT BMG, 1 x 7.62 mm DT RMG	85 mm: 59, 7.62 mm: 2520	37	17	36°	30°	2.5	1	1.3	0.78	150	V-2-IS	diesel	12	520	10R or 10RK	TPU-4-BisF
IS-2 (IS-122)	<i>heavy breakthrough tank</i>	46 080	4	9.83x3.07x2.74	0.465	121.9 mm D-25T gun, 1 x 12.7 mm DShK AAMG, 1 x 7.62 mm DT CMG, 1 x 7.62 mm DT RMG	121.9 mm: 28, 12.7 mm: 250, 7.62 mm: 2520	37	17	36°	27°	2.3	1	1.3	0.81	150	V-2-IS	diesel	12	520	10R or 10RK	TPU-4-BisF
IS-3	<i>heavy breakthrough tank</i>	46 500	4	9.85x3.15x2.45	0.45	121.9 mm D-25T gun, 12.7 mm DShK AAMG, 1 x 7.62 mm DT CMG	121.9 mm: 28, 12.7 mm: 250, 7.62 mm: 756	40	17	32°	30°	2.5	1	1.1	0.82	185	V-2-IS	diesel	12	520	11RK	TPU-4-BisF

ABBREVIATIONS:
TMG - turret machine-gun;
CMG - coaxial machine-gun;
BMG - bow machine-gun;
RMG - rear machine-gun;
AAMG - antiaircraft machine-gun;
HMG - heavy machine-gun;
GAZ - Gorkovskiy Automobil Factory;

NOTES:
¹ average speed;
² 36 liters of liquid, max range of throwing - 25 metres;
³ numbers for tanks w/o radio, numbers in parenthesis for tanks with radio;
⁴ 360 liters of liquid, max range of throwing - 50 metres;
⁵ 140 liters of liquid, max range of throwing - 50 metres;
⁶ 360 liters of liquid, max range of throwing - 35 metres;
⁷ for tanks on tracks, numbers in parenthesis for tanks on wheels;
⁸ for tanks on tracks;
⁹ 170 liters of liquid, max range of throwing - 60 metres;
¹⁰ number in parenthesis for T-34 with hexagonal turret;
¹¹ 100 liters of liquid, max range of throwing - 65 metres;
¹² 200 liters of liquid, max range of throwing - 90 metres;
¹³ 600 liters of liquid, max range of throwing - 65 metres;
¹⁴ 600 liters of liquid, max range of throwing - 90 metres.

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Specifications of the Soviet AFVs

See also:
[Production Soviet tanks](#)
[Experimental vehicles and prototypes](#)

Production Self-Propelled Guns

AFV designation	AFV name	Weight, kg	Crew	Dimensions, m	Clearance, m	Armament	Ammunition	Speed		Obstacles					Ground pressure, kg / cm ²	Max. range, km	Engine				Radio	Internal communic.
								On road, km / h	Off road ¹ , km / h	gradient, degr.	side gradient, degr.	trench, m	vertical wall, m	fording, m			index	type	cylinders	power, hp		
ZIS-30	light tank destroyer	?	5	?	?	57 mm ZIS-2 gun, 1 x 7.62 mm DT BMG	57 mm: 20, 7.62 mm: 756	47	?	?	?	?	?	?	?	150	GAZ M-1	petrol	4	50	?	?
SU-76M (SU-15)	light self-propelled gun	10 600	4	4.97x2.72x2.1	0.3	76.2 mm ZIS-3Sh gun	60	45	19	28°	30°	1.6	0.6	0.9	0.545	190	2 x GAZ-203	petrol	6	2 x 70	9R	TPU-3
SU-122	medium assault gun	30 900	5	6.95x3x2.24	0.4	121.9 mm M-30 howitzer	40	55	25	35°	25°	2.5	0.73	1.3	0.73	150	V-2-34	diesel	12	500	9R	TPU-3-BisF
SU-85	medium tank destroyer	29 600	4	8.13x3x2.3	0.4	85 mm D-5S gun	48	55	25	35°	25°	2.5	0.73	1.3	0.7	150	V-2-34	diesel	12	500	9R or 9RS	TPU-3-BisF
SU-85M	medium tank destroyer	31 200	4	8.13x3x2.25	0.4	85 mm D-5S gun	60	50	20	35°	25°	2.5	0.73	1.3	0.8	140	V-2-34M	diesel	12	520	9R or 9RS	TPU-3-BisF
SU-100	medium tank destroyer	31 200	4	8.13x3x2.25	0.4	100 mm D-10S gun	34	50	20	35°	25°	2.5	0.73	1.3	0.8	140	V-2-34M	diesel	12	520	9R or 9RS	TPU-3-BisF
SU-152	heavy assault gun	45 500	5	8.95x3.25x2.45	0.44	152.4 mm ML-20S howitzer	20	43	14	36°	30°	2.5	1.2	1.6	0.85	165	V-2K	diesel	12	600	10R or 10RK	TPU-3R
ISU-152	heavy assault gun	46 000	5	9.05x3.07x2.48	0.47	152.4 mm ML-20S howitzer, 1 x 12.7 mm DShK AAMG	152.4 mm: 20, 12.7 mm: 250	35	18	36°	30°	2.5	1	1.3	0.8	145	V-2-IS	diesel	12	520	10R	TPU-4-BisF
ISU-122	heavy assault gun	46 000	5	9.85x3.07x2.48	0.47	121.9 mm D-25S gun, 1 x 12.7 mm DShK AAMG	121.9 mm: 30, 12.7 mm: 250	35	18	36°	30°	2.5	1	1.3	0.8	145	V-2-IS	diesel	12	520	10R	TPU-4-BisF
ISU-122S	heavy assault gun	46 000	5	9.85x3.07x2.48	0.47	121.9 mm D-25S gun, 1 x 12.7 mm DShK AAMG	121.9 mm: 30, 12.7 mm: 250	35	18	36°	30°	2.5	1	1.3	0.8	145	V-2-IS	diesel	12	520	10R	TPU-4-BisF

ABBREVIATIONS:
TMG - turret machine-gun;
CMG - coaxial machine-gun;
BMG - bow machine-gun;
RMG - rear machine-gun;
AAMG - antiaircraft machine-gun;
GAZ - Gorkovskiy Automobil Factory;

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Specifications of the Soviet AFVs

See also:
[Production Soviet tanks](#)
[Production self-propelled guns](#)

Experimental Vehicles and Prototypes

AFV designation	AFV name	Weight, kg	Crew	Dimensions, m	Clearance, m	Armament	Ammunition	Speed		Obstacles					Ground pressure, kg / cm²	Max. range, km	Engine				Radio	Internal communic.
								On road, km / h	Off road¹, km / h	gradient, degr.	side gradient, degr.	trench, m	vertical wall, m	fording, m			index	type	cylinders	power, hp		
PPG	light tankette	1 730	2	2.5x1.72x0.86	0.3	2 x 7.62 mm DT TMG	1575	18	?	35°	?	1	0.4	?	?	?	PMZ	petrol	2	16	n/a	n/a
T-19	main battle tank	8 050	3	4.5x2.2x2.3	0.33	1 x 37 mm Hochkiss or 37 mm PS-1, 2 x 7.62-ii ÄÖ	37 mm: 98, 7.62 mm: 3500	27	?	45°	?	2	0.62	1.2	0.362	192	-	petrol	6	100	n/a	n/a
T-20	light tank	5 800	2	4.5x2.2x1.8	0.31	1 x 37 mm Hochkiss or 37 mm PS-1, 1 x 7.62 mm DT	37 mm: 160, 7.62 mm: ?	22.8	?	?	?	1.7	0.59	1	0.383	180	Special tank engine by A.Mikulín	petrol	4	57	n/a	n/a
A-20	medium wheeled-tracked tank	17 800	4	5.76x2.65x2.35	0.41	45 mm gun model 1932, 1 x 7.62 mm CMG, 1 x 7.62 mm BMG	45 mm: 152, 7.62 mm: 2709	74.7	39	40°	34°	3.5	1.2	1.4	0.61 ⁸	400	V-2 (first series)	diesel	12	450	71-TK-3	TPU-2
A-32	medium wheeled-tracked tank	19 100	4	5.76x2.73x2.35	0.4	45 mm gun model 1932, 1 x 7.62 mm CMG, 1 x 7.62 mm BMG	45 mm: 72, 7.62 mm: 1638	74.7	32	?	?	?	?	?	?	?	V-2 (first series)	diesel	12	450	?	?
T-43	medium tank	30 500	4	5.92x3x2.4	0.45	76.2 mm F-34 gun, 1 x 7.62 mm CMG, 1 x 7.62 mm BMG	76.2 mm: 98, 7.62 mm: 2770	48	20	?	?	?	?	?	?	320	V-2-34	diesel	12	500	?	?
SMK	heavy tank	55 000	7	8.75x3.4x3.25	0.5	7.62 mm L-10 gun, 45 mm gun model 1932, 2 x 7.62 mm DT CMG, 1 x 7.62 mm DT RMG, 1 x 7.62 mm DT AAMG	76.2 mm: 113, 45 mm: 300, 7.62 mm: 5733	35.5	15.5	37°	30°	4	1.1	1.7	0.685	230	AM-34	petrol	12	850	71-TK-3	TPU-6a
T-100	heavy tank	58 000	8	8.49x3.4x3.43	0.525	76.2 mm L-10 gun, 45 mm gun model 1932, 2 x 7.62 mm DT CMG, 1 x 7.62 mm DT BMG	76.2 mm: 120, 45 mm: 393, 7.62 mm: 4284	35.7	14	42°	25°	4	1.3	1.25	0.68	120	GAM-34	petrol	12	850	71-TK-3	TPU-6
KV-1 model 1939	heavy tank	44 000	4	7.02x3.34x2.67	0.42	76.2 mm L-11 gun, 1 x 7.62 mm DT CMG, 1 x 7.62 mm DT BMG, 1 x 7.62 mm DT RMG	76.2 mm: 116, 7.62 mm: 2583	32	10.2	36°	30°	2.7	1.2	2	0.79	180	V-2	diesel	12	500	71-TK	TP-2-4
KV-2 model 1940	heavy assault tank	54 000	6	7.02x3.34x3.45	0.395	152.4 mm M-10T gun, 1 x 7.62 mm DT CMG, 1 x 7.62 mm DT BMG, 1 x 7.62 mm DT RMG	152.4 mm: 36, 7.62 mm: 3402	32	10.2	36°	30°	2.7	1.2	2	0.85	145	V-2	diesel	12	500	71-TK	TPU-2
SU-14Br2	heavy self-propelled howitzer	50 000	7	10x3.37x3.56	0.45	152.4 mm Br-2 howitzer, 4 x 7.62 mm DT ?MG	152.4 mm: 88, 7.62 mm: 2835	15	10-12	30°	20°	3.8	0.9	1.5	0.73	100	M-17F	petrol	12	700	71-TK-3	TPU-3
SU-100Y	heavy self-propelled gun	64 000	6	10.9x3.4x3.29	0.455	130 mm 1-B-13 gun, 3 x 7.62 mm DT MG	130 mm: 30, 7.62 mm: 1800	32	12	42°	25°	4	1.3	1.25	0.75	120	GAM-34-BS	petrol	12	890	71-TK-3	TPU-6
SU-101	self-propelled gun	34 000	4	6.1x3x2.1	0.4	1 x 100 mm D-10S, 1 x 12.7 mm DShK AAMG 1 x 7.62 mm DTM TMG	?	50	25	35°	25°	2.5	0.73	1.3	0.85	350	V-2-34	diesel	12	500	9RM or 9RS	TPU-3bisF
TG	powerful medium tank	25 000	5	6.5x2.81x3.04	0.5	1 x 37-mm GS, 1 ð 76-mm PS-3 3 ð 7,62-mm Maxim 2 x 7,62-mm DT	37-mm: 80 76-mm: 50 7.62-mm: 7000	35	25	35-40°	?	3	1	1,2	0,5	250	M-6	petrol	8	500	n/a	n/a

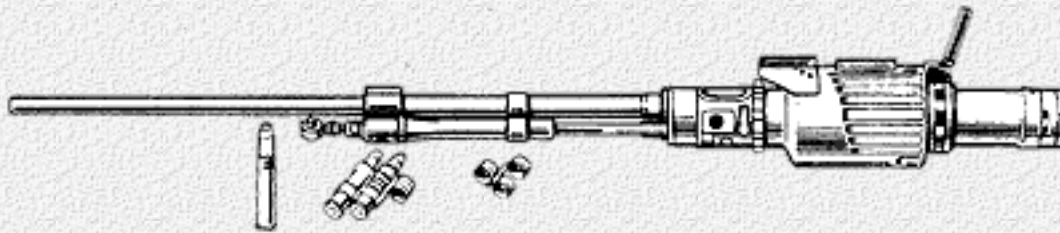
ABBREVIATIONS:
TMG - turret machine-gun;
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AAMG - antiaircraft machine-gun;
HMG - heavy machine-gun;
GAZ - Gorkovskiy Automobil Factory.

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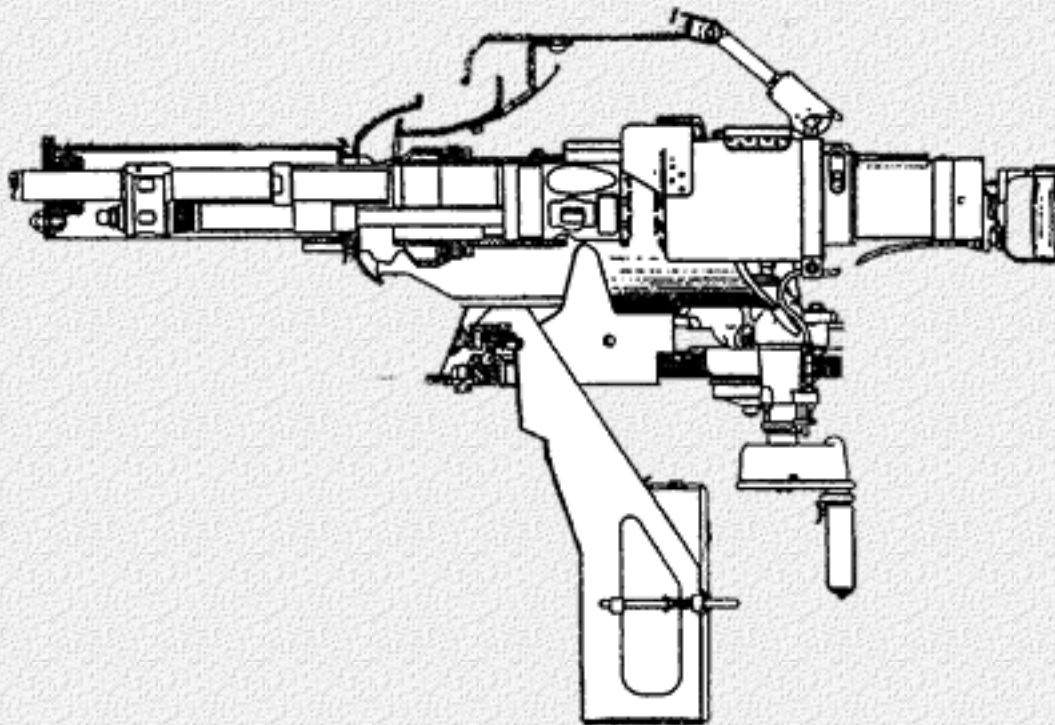


20MM TANK GUN TNSh

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20 mm Gun ShVAK



TNSh mounted in the T-40 tank

SPECIFICATION

Parameter	Value
Calibre, mm	20
Bore length, clb	82,4
Weight of pendulous elements, kg	68
Weight of recoil elements, kg	?
Normal recoil length, mm	?

The beginning of war prompted the urgent need to arm light amphibious tanks with a small-calibre gun, because such a solution would allow it to be used both to fight infantry and as a mobile anti-tank weapon. As early as 5th July 1941, NKV instructed OKB #15 to install the ShVAK gun into the turret of the [T-40](#) tank. This task was solved at the first attempt by Nudel'man (who replaced Taubin in OKB #16), rather than Shpital'ny, at the beginning of August. The test firings of the 20mm and [23mm guns](#) from the mount developed at OKB #16 were performed on 4th August. They showed positive results on the whole, but the guns themselves produced a number of failures (they often jammed). To finish this work, in accordance with the Order of the

Max recoil length, mm	?
Ammunition	automatic, belt feed
Ballistic	20mm Aircraft Gun ShVAK
Practical ROF, shot/min	200

People's Commissar of Armament, the tank turret with the 20mm gun was sent to OKB #15 where the purely artillery-related issues were worked on and where it was refined to its final design. The aircraft version of the ShVAK gun was used as the basis for the 20mm tank gun's design; its barrel

ARMOUR PENETRATION

Projectile	Angle	Range, m			
		50	100	300	500
Armour-piercing	90°	35	28	22	15

was borrowed from the engine-installed version of the gun; the reloading mechanism - from the turret version of this gun; and the firing mechanism, sights, and back plate were designed from scratch.

In September 1941, as a replacement for the T-40, the Armed Forces accepted the [T-60 Light Tank](#) armed with the 12.7mm DShK machine-gun, just as its predecessor. In accordance with the combined decision of People's Commissar of Tank-Building Industry and People's Commissar of Armament, the tank was equipped with the experimental version of the 20mm gun designated "ShVAK-tankovaya" (ShVAK-for tanks). Nine days later it was accepted for service. Since 1st October 1941, the T-60 Light Tank was rearmed with this gun and accepted for service under the designation of T-60Sh. However, the tank gun performed badly and as a result, its production was extremely erratic until the winter. It was only on 5th December 1941, that the refined gun design was accepted for service under the designation of the TNSh (tank gun of Nudel'man - Shpital'nyj) and its production was started at Factory #2.

In addition, the T-38 tank (nowadays it is exhibited at the Central Museum of Armed Forces) and the twin-turreted [T-26 Light Tank](#) were armed with the TNSh guns for experimental testing in the second half of October 1941. Besides, the [T-30](#) and T-40 tanks earmarked for factory overhaul had been re-armed with this gun since January 1942.

Although the 20mm TNSh was theoretically similar to the German KwK 38 gun, in terms of its main performance characteristics, in practice its muzzle velocity turned out to be poor due to the use of cartridge cases with the powder charge of the 12.7mm machine-gun. The armour penetration capability of the gun, especially considering the use of the carbide tungsten core, was quite high; however, the behind-armour performance of the projectile was insufficient. Usually, the German tank, armoured car or armoured personnel carrier hit by a burst from the TNSh left the battle undamaged, if the core

fragments did not hit either the fuel cells or the driver. The bursting performance of the round was also low.

Usage

The TNSh gun was used as armament for the following tanks:

Production tanks: T-40(T-30), T-60Sh.

Experimental tanks: T-38.

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Sources:

"Artillerijskoye Vooruzhevie Sovetskikh Tankov 1940-1945" Armada-Vertical, #4, 1999

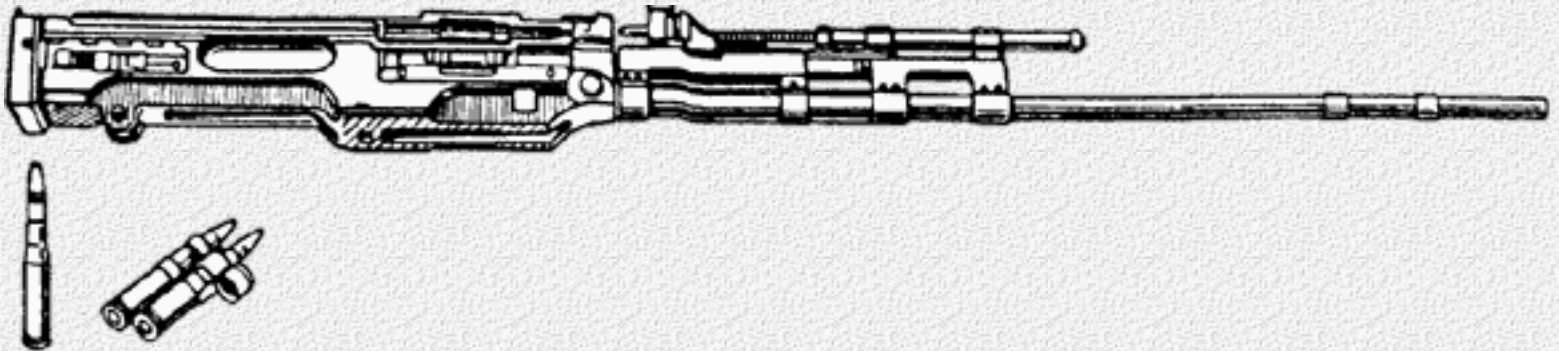
V.Grabin "Oruzhie Pobedy", 1987

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23MM TANK GUN VYa

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VYa TANK GUN SPECIFICATION

Parameter	Value
Calibre, mm	23
Bore length, clb	?
Weight of pendulous elements, kg	?
Weight of recoil elements, kg	?
Normal recoil length, mm	?
Max. recoil length, mm	?
Ammunition	automatic, belt feed
Ballistic	23mm Aircraft Autocannon VYa
Practical ROF, shot/min.	?

Whilst conducting research related to increasing the [T-60 Light Tank's](#) armament power in February 1942, the staff of the experimental department of Factory #2 of the People's Commissariat of Armament, installed a 23mm gun into the T60 turret. The 23mm gun was a modification of the Aircraft Gun VYa. The tank version turned out to be somewhat more effective than the

aviation one, but the operational experience was short lived, because in 1942 there was not enough 23mm ammunition even for the IL-2 Ground Assault Aircraft. Lastly, the abrupt gun recoil jammed the tank's turret. Altogether sixteen VYa guns were manufactured for the T-60 tank in March-April, it is unknown though if they were installed on any tanks.

Usage

The VYa Gun was used to equip the following war-time tanks:

Production tanks: none.

Experimental tanks: T-60.

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Sources:

"Artillerijskoye Vooruzhevie Sovetskikh Tankov 1940-1945" Armada-Vertical, #4, 1999

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23MM TANK GUN PT-23TB

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PT-23TB GUN SPECIFICATION

Parameter	Value
Calibre, mm	23
Bore length, clb	?
Weight of pendulous elements, kg	?
Weight of recoil elements, kg	?
Normal recoil length, mm	?
Max. recoil length, mm	?
Max range, m	9000
Ammunition	automatic, belt feed
Ballistic	-
Practical ROF, shot/min.	over 300

Even though the tank guns of 45mm calibre and smaller were considered obsolescent, the experimental work on them continued. This happened because RKKA accepted the [T-40 Light Amphibious Tank](#) into service, which had an armament consisting of a 12.7mm machine-gun DK (and later - DShK) already considered insufficient in 1940.

ARMOR PENETRATION TABLE

Round	Angle	Distance, m			
		50	100	300	500
AP	90°	35	28	22	15

Muzzle velocity of the armor-piercing projectile is 830 m/s.

As far back as in 1939, OKB #16 headed by Ya.G. Taubin was ordered to develop a clip-loading 23mm automatic gun for the T-40 tank.

The prototype gun received the designation

PT-23TB (23mm Tank Gun of Taubin and Baburin design), and was built "in metal" by OKB #16 on the basis of the design of the light 23mm infantry anti-tank/anti-aircraft gun. An experimental tank, whose turret contained the only experimental prototype of the gun, was made operational, and used for firing range trials in December 1940.

Nevertheless, in implementing the instruction of the People's Commissariat of Armament, on 25th January, 1941, the gun was removed from the tank and sent to Factory #5 where work on the armament for armoured snowmobiles for NKVD was underway. Soon, the Head of the Design Bureau Taubin was relieved of duty and arrested, and all the advanced work on the PT-23TB gun was stopped.

Usage

The PT-23TB gun was used as armament for the following tanks:

Production tanks: none.

Experimental tanks: T-40.

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Sources:

"Artillerijskoye Vooruzhevie Sovetskikh Tankov 1940-1945" Armada-Vertical, #4, 1999

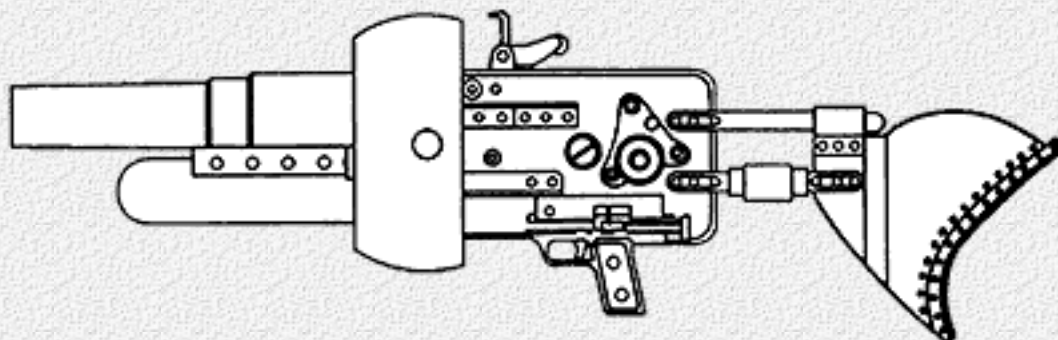
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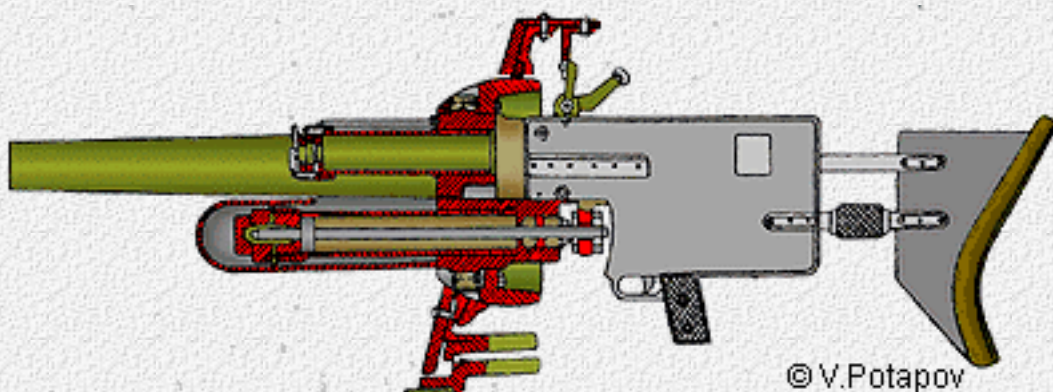
37MM TANK GUNS OF HOTCHKISS AND PS-1

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37 mm Hotchkiss Gun



37 mm Gun PS-1

The French 37mm tank gun by Hotchkiss was a redesigned variant of the naval gun accepted into service back in the 1880s. The gun had an automated breech-block (this means the breech-block had to be opened manually). The gun's compressor was hydraulic, its recuperator was spring-based. Its ballistics were already considered mediocre by the beginning of the 20th Century; in the 1920s its ballistics were significantly inferior to that of other guns of the same class. The performance of the round was ineffective against both armoured and soft targets.

In 1928, Peter Syachentov improved the gun, among other things the striker and trigger mechanism was improved; the gun's mantlet also underwent some changes. Nevertheless, the gun's

SPECIFICATION*

Parameter	Value
Calibre, mm	37
Gun weight, kg	?
Weight of pendulous elements, kg	103.8/?
Normal recoil length, mm	?
Max. recoil length, mm	?
Ammunition	fixed
Barrel length, clb	21/31
Max range, m	?
Practical ROF, shot/min	5-6

SHOOTING TABLE

Projectile	Weight, kg	Muzzle vel. m / s	Range, m
Pzgr.144(f)	0.39	600	?
Pzgr.146(f)	0.7	705	?

ARMOUR PENETRATION TABLE*

Projectile	Angle	Range, m		
		100	500	1000
Pzgr1.44/146	60°	25/29	19/23	-/16
	90°	-	-	-

*Hotchkiss data in numerator; PS-1 data in denominator.

performance remained mediocre at best. The gun was officially accepted into service in the USSR in 1920. The original Hotchkiss Gun was manufactured at Factory #8 located in the town of Podlipki near Moscow. At that factory it received the designation of "7K", some documents of that period named this gun PS-1. In June 1928, the procurement order for the first 206 Hotchkiss

guns was given out.

In total, the factory produced 1080 Hotchkiss guns during 1931-1932. The manufacturing of this gun was cancelled in 1932. The 37mm Hotchkiss Gun was installed on the tanks "Renault" and "Renault Russkiy" manufactured by Sormovo Factory #112, MS-1 (T-18), twin-turret T-26 tanks, they were also installed on the armoured cars BA-27, BA-27M, and BA-I. By November 1, 1936, Red Army possessed 1327 combat and 60 training 37mm Hotchkiss guns.

Usage

The Hotchkiss and PS-1 guns were used for armament of the following domestically produced vehicles:

Production tanks: "Renault Russian", [T-18 \(MS-1\) mod.1927-1930](#), [T-26 mod.1931-1933](#).

Production armoured cars: [BA-I](#), BA-27, BA-27M.

Experimental tanks: T-19, T-20.

AMMUNITION USED IN USSR FOR HOTCHKISS AND PS-1 GUNS

Ammunition

Parameter

	Hotchkiss Cast Iron Cannonball	Steel HE Round	Cast Iron HE Round	Normal Canister Round	Short Canister Round
Shell weight, kg	0.71	0.713	0.716	?	0.684
Projectile weight, kg	0.5	0.5	0.51	?	0.51
Cartridge case weight, kg	0.168	0.168	0.168	0.168	0.168
Propellant charge weight, kg	0.04	0.041	0.038	0.038	0.038
Explosive charge weight, kg	-	0.04	?	-	-
Shell lenght, mm	162	165	167	?	86.4
projectile lenght, mm	85	96.6	91.5	?	86.4
Number of bullets in canister round	-	-	-	75	51(?)

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Sources:

"Artillerijskoye Vooruzhevie Sovetskikh Tankov 1940-1945" Armada-Vertical, #4, 1999

T.Jentz "Panzertruppen" vol.1, 1996

A.Shirokorad "Entsiklopediya Otechestvennoi Artillerii", 2000

M.Svirin, A.Beskurnikov "Pervie Sovetskie Tanki", Armada #1

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The MS-1 Small Escort Tank

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Note: All Russian terms and abbreviations marked as *red italic* are described in the [Glossary](#).

Development History



The Italian Fiat-3000. (V.Potapov)



M.Tukhachevsky inspecting the T-16 on trials. (M.Svirin)

The Malyi Soprovozhdeniya MS-1 (Small Escort MS-1), which later received the "T-18" designation, emerged as the first Soviet production tank. The name falls under the mid-1920s Soviet classification that categorised tanks into "Small," "Main," and "Maneuverable", the "Malyi Soprovozhdeniya" means Small Escort. Please notice that according to the Soviet nomenclature of that time, the MS-1 wasn't light tank but small support(escort) tank.

In May and June 1926, a three-year plan for tank production was developed, based on a concept of a breakthrough of the 10-km frontline that is defended by two foe's

infantry divisions. A number of foreign armoured fighting vehicles were analysed as a possible basis for a mass-produced Soviet tank by a special council of **RKKA** High command, **GUVP** and **OAT** held in September 1926. The French Renault tank classified as M- Small in **RKKA** nomenclature, was found relatively suitable for infantry support purposes. However, the council members noticed a number of serious problems with the tank, like heavy weight (prohibiting truck transport), low speed, and weak armament. The original 37-mm Hochkiss or Puteaux guns did not provide accurate fire beyond a distance of 400 metres. Sormovo-built siblings (also known as the "Russian Renault") were mentioned as *"having unsatisfactory workmanship, having insufficient armament, and being too expensive."*

The Italian FIAT-3000 was considered a more suitable prototype due to its lower weight and its higher speed. This tank was thoroughly studied by the **OAT** Design Bureau, and a 5-ton tank project lead by S. Shukalov was launched in mid-1926. The first prototype was built in the Bolshevik Factory and was delivered for testing in March 1927. This vehicle received the "T-16" index. Compared with the "Russian Renault," it had less size, less weight, less cost, and higher speed. Nevertheless, it still had a bunch of serious problems, so a number of parts and mechanisms were recommended for improvement. One more roadwheel was added to the suspension, and some of the details of the engine and of the transmission were altered. Because of its unsatisfactory powertrain performance, A. Mikulin (one of the leading tank engine designers) had to relocate to the factory to work there.



The early production T-18. *(M.Svirin)*



The pre-production T-18 on final trials. July 1927.

(M.Svirin)



The pre-production T-18 on final trials. July 1927.

(M.Svirin)

A new tank was built by mid-May, and after a brief road test near Leningrad, it was sent to Moscow (probably May 20-25) for final testing and for approval under the index "Small Support Tank Model 1927 MS-1 (T-18)." It is noteworthy that a whole range of transportation methods (closed and open railroad carriages, truck bed and trailer, and on-tracks) were used during this Leningrad-Moscow trip. The armament was not ready yet, and therefore a mock-up gun was installed. The tank was intended to be painted, but the **OAT** issued an order "To paint only after acceptance for service!" Probably after the failure of the T-16, which was painted light-green right before the trials, the **OAT** management felt uncertain. Hence, the tank entered the proving grounds being covered

with only light-brown primer. This method of presentation for untested vehicles later became standard procedure.

A special committee was formed to conduct these tests, which were completed on June 11 to 17, 1927 in the Moscow region. As the vehicle was still unarmed, only extensive off-road testing was performed. The tank was deemed generally successful, and it was recommended to accept for service. No later than February 1, 1928, **RKKA** ordered 108

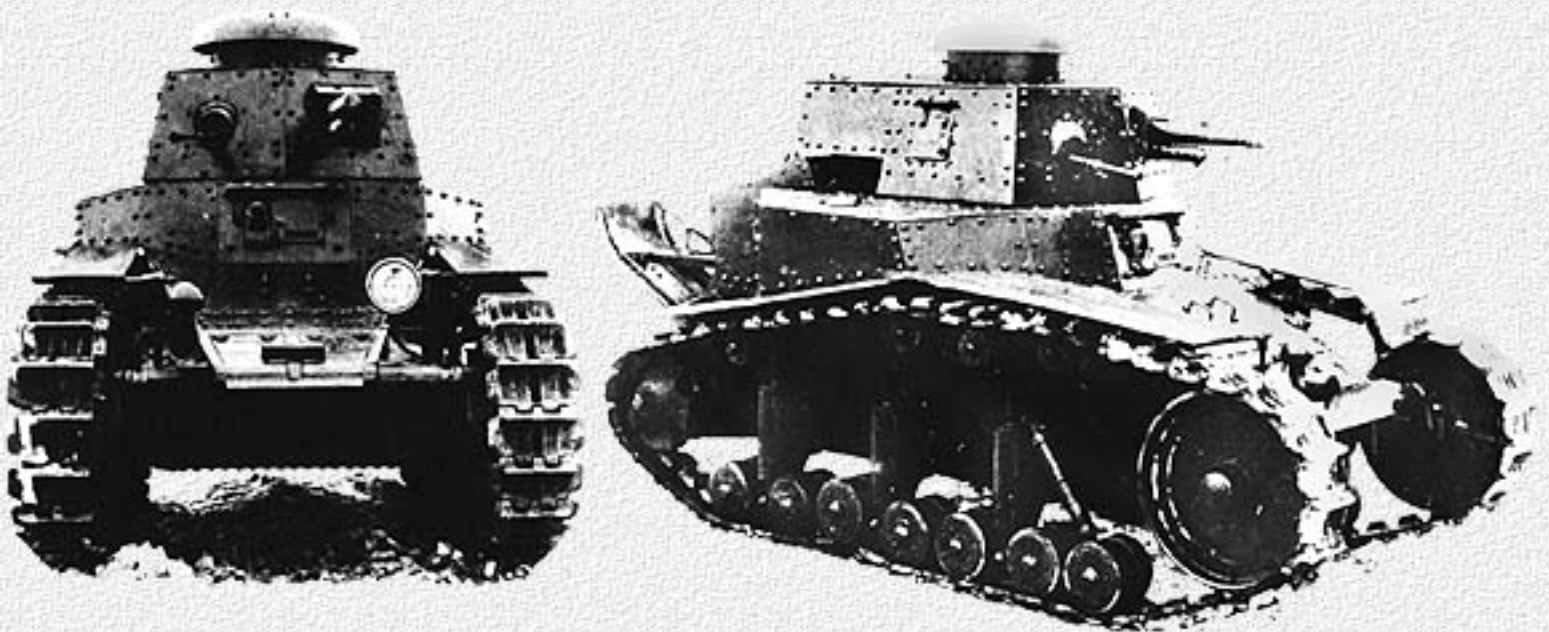
T-18 tanks to be manufactured during 1928-29 (30 before the fall of 1928).

OSOAVIAKHIM sponsored the first 30 tanks, and these tanks participated in parades on November 7, 1929 in Moscow and Leningrad. Unofficially, this series was named "Our response to Chamberlain."

Initially, only the Bolshevik plant produced T-18 tanks. In April 1929, the Motovilikha Factory (formerly Perm' Artillery Factory) joined in the production and the summary output was increased. However, mass-production of the T-18 in 1929 was slow, so only 96 of the planned 133 vehicles were built. When the Motovilikha Factory finally reached full production levels, the 1929-30 quota of T-18 production was raised to 300 vehicles.

In the fall of 1929, the T-18 participated in the next stage of tests. A two-metre wide by 1.2-metre deep trench was found to be a major obstacle for the tank. It became trapped, and the tank could not escape the trench by either forward or reverse throttle. After a proposal by M. Vasil'kov and by order of Leningrad region Armored force commander S. Kokhansky, some tanks were equipped with a second "tail" up front. They were immediately nicknamed "Nosorog" (Rhinoceros) or "Tyani-tolkaj" (Push-Pulley). Obstacle crossing performance of these tanks slightly improved, but the driver's visibility was reduced dramatically.

The T-18 Model 1930





Trials of the T-18 with the T-26's running gear.

(M.Svirin)



The close view of the T-26's running gear used for the T-18.

(M.Svirin)

In 1929, the performance of the T-18 was already inadequate according to the increasingly demanding **RKKA** General Staff. On July 17 and 18, a session of the Revolutionary Military Council had issued a new structure for tractor, automotive and armored forces" (refers to motorised, mechanised, and tank forces). It was specified that the T-18 tank had become outdated for modern warfare. The directive listed a number of requirements for a possible new support tank already indexed as the T-19.

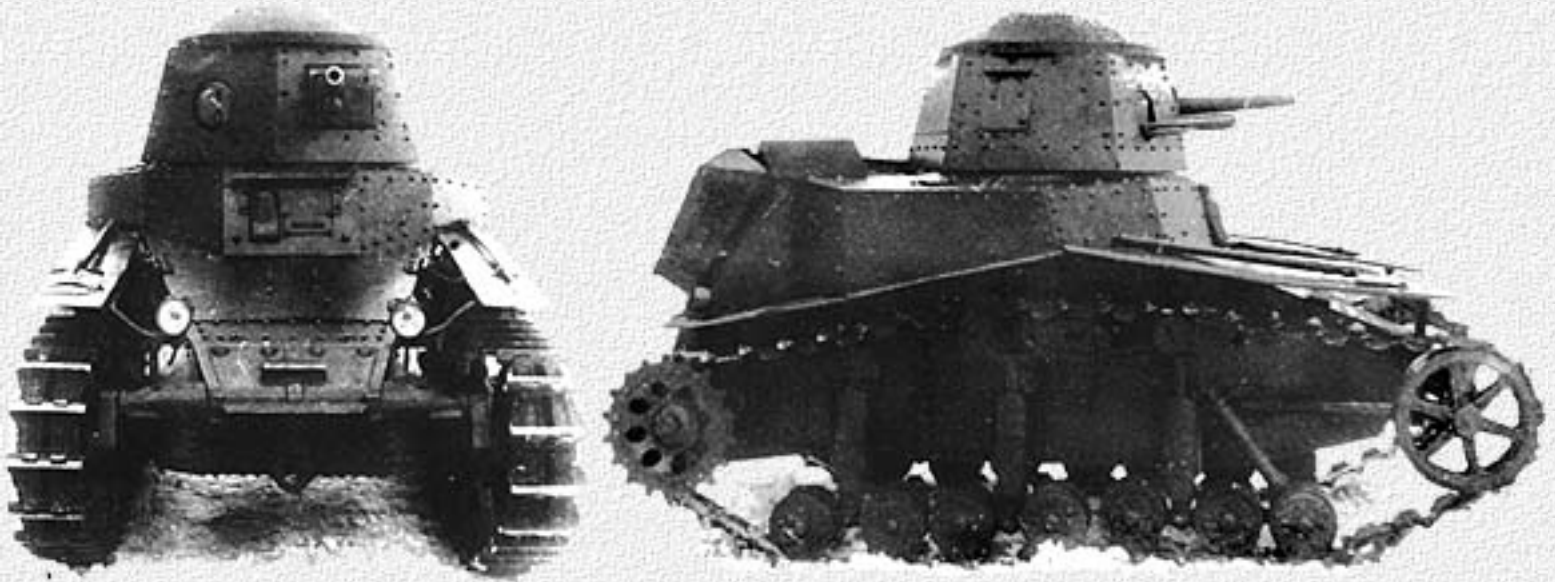
The directive stated that "until the creation of a new tank, the MS-1 (T-18) should be accepted as an **RKKA** vehicle. An increase in speed to 25 km/h is highly recommended." To reach this goal, the engine's

power was increased to 40 hp, and a new four-speed (instead of three-speed) gearbox and a new cast drive-wheel were installed. It was proposed to re-arm the tank with a new 37-mm high-velocity gun, but the armament stayed the same. Despite this, the turret was redesigned with an addition of a rear square niche where a radio intended to be installed (in fact, some tanks didn't receive radio). This improved tank was named "MS-1 (T-18) Model 1930." However, the modernisation did not enhance performance significantly (for example, the speed still failed to reach 25 km/h). So the construction of

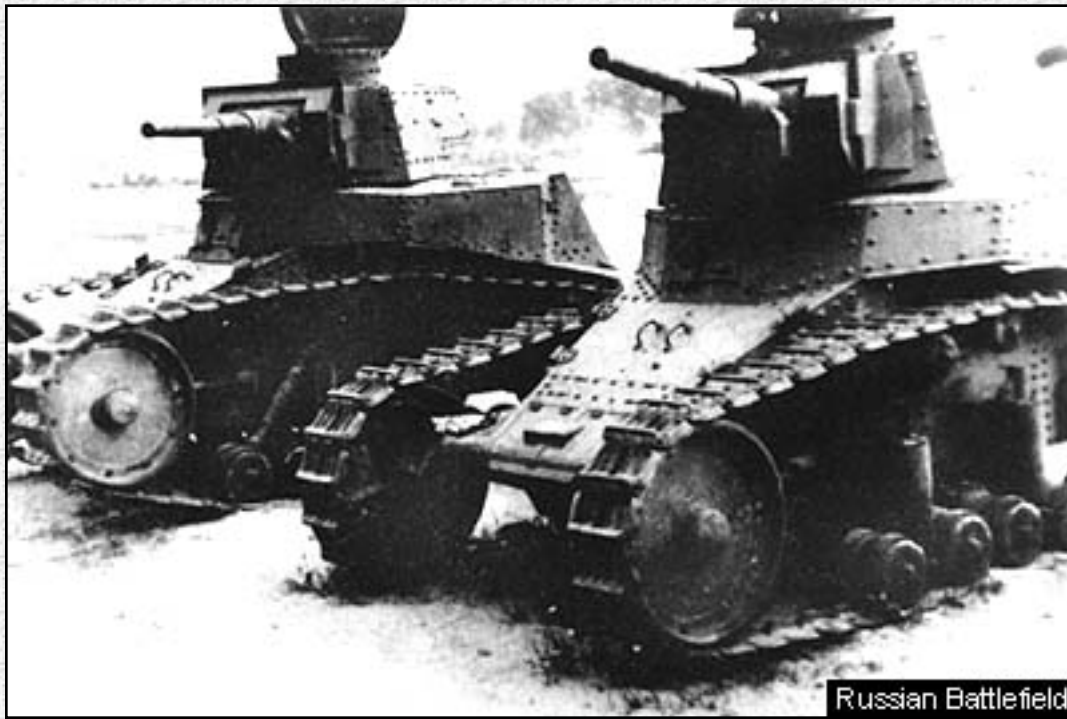
a new support tank T-20 (some sources name it "T-18 Refined") started in late 1929. The T-18 Model 1930 stayed in production until the appearance of the T-26 at the end of 1931.

In 1933, another attempt to modernise the T-18 was undertaken through alteration of its running gear similar to that of the T-26. A prototype was tested on May 19, 1933 and proved to be a failure. The engine tended to stop in third gear. The roadwheels were loaded unevenly, so the tank nodded while starting and while braking. The tank was unable to overcome a 30-degree hill even in first gear.

The T-18M



In 1937, the **GABTU** decided to modernise all outdated armored fighting vehicles made before 1930 in order to make them useful in modern war. T-18 tanks played an important role in this modernisation program. The primary attention was paid to an exchange of the powertrain. The GAZ-M1 engine coupled with the radiator and the



Russian Battlefield

A couple of T-18 tanks armed with 45-mm gun. Having no engines these tanks were captured by the Germans in June 1941. (RGAKFD)

transmission from the T-38 tank was considered. For this purpose, the engine compartment was rebuilt. The turret shape changed again, the new conical lid was made of high-carbon steel and replaced the mushroom-shaped commander's cupola. The rear niche of the turret was removed. This tank received the T-18M index. The conversion of the T-18 to the T-18M was made by Factory #37 (in Ordzhonikidze, today

Vladikavkaz City). Testing of the upgraded vehicle took place in March 1938. A speed of 24.3 km/h was reached, but the old engine did not function well in fourth gear (the planned speed was 33-35 km/h). Because the centre of gravity shifted backwards, the tank was unstable on wet roads and showed poor uphill torque. The verdict was that the idea of using the GAZ-M1 powertrain was reasonable. However, the battle value of T-18M was negligible when compared to the modernisation cost.

REFERENCES:

[Specification of Soviet tanks](#)

[Specifications of Soviet tank guns](#) [The blueprint of the T-18 Model 1927](#)

[The blueprint of the T-18 Model 1930](#)

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Sources:

A.Beskurnikov, M.Svirin, "Pervye Sovetskie Tanki" Armada #1;

Bruno Benvenuti "Carri Amati" vol.1, Roma;

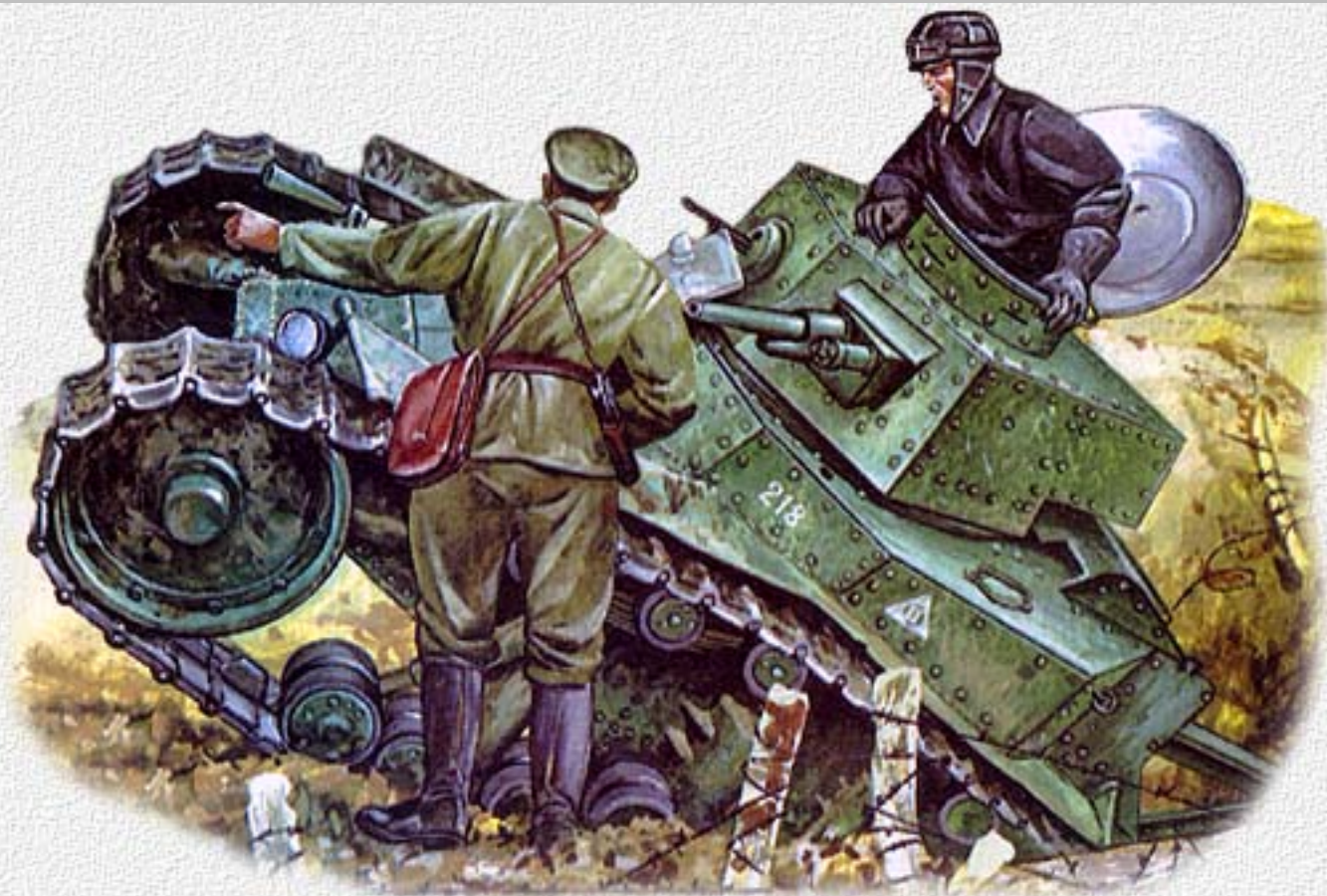
A.Beskurnikov "Pervij Serijnij Tank Malyi Soprovozhdeniya MS-1", Arsenal-Press, Moscow, 1992.

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The MS-1 Small Escort Tank

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Combat Employment of the T-18

Service in the forces of the first Soviet tanks did not leave behind a large number of clear combat examples.

Altogether some 959 T-18 tanks were built, of which 4 were handed over to the OGPU, 2 to the 4th Directorate, and 1 to the Military-Chemical Directorate of the *РККА*. The remaining tanks were sent to tank battalions, regiments, and brigades of the combined arms formations that were being created, and as well to the regiments and brigades of the mechanised formations that were being formed in 1929.

Escort tanks were actively utilized for combat training of troops (103 vehicles were made



**T-18 on maneuvers in Moscow Military District,
1930.** (*M.Svirin*)

available to **OSOAVIAKHIM** and other military-technical training institutions). Thanks to these training opportunities early tankers of the **RKKA** became familiar with the nuances of operating in cooperation with infantry units, and artillery and infantrymen mastered a form of combat new to them - antitank defense.

The first serious test for the T-18 was the large Bobruisk maneuvers of

1929, at which several commissions monitored the performance of the tanks. The tanks acquitted themselves well in the course of these maneuvers. Despite extremely difficult and grueling conditions of their use, almost all of the T-18s withstood the test. But there were countless minor technical breakdowns that the commission recorded in a single document. This list served as an additional stimulus for modernization of the tank that was undertaken in 1929-30. During this same year the tank took part in actual combat actions. This occurred in the course of the military conflict on the **KVZhD**, which from the contemporary perspective has been classified as a local conflict.



Russian Battlefield

T-18 tanks on parade in Moscow, 1 May 1931. *(M.Svirin)*



Russian Battlefield

Large Bobruysk maneuvers, 1929. *(CMVS)*



Russian Empire built the **KVZhD** during the years 1887-1903. In 1924 the two governments signed the Soviet-Chinese agreement in Peking, by which the **KVZhD** was considered to be a joint enterprise. However, in the opinion of V. K. Blyukher, the incident of the fall of 1929 in Transbaikal "was neither peace nor war, but only a conflict". Each of the sides participating in this conflict did not desire the interference of a third party, and any military operation in such conditions would have success only if it were prepared in secret and executed with total surprise, after which the verbal wrangling between diplomats could be dragged out for months.

In the fall of 1929 the Transbaikal group of forces of the **ODVA** were prepared to deliver a lightning-like defeat on the Chinese Mukden Army in the area of Manchzhuria and Dzhalaynor stations and Dzhalaynor mines.

For this purpose,



**Chinese field fortifications near Dzhalaynor station:
antitank ditch, stone-earth DOT, trenches. (CMVS)**

opposing the Chinese grouping of 12-16 thousand men the Transbaikal group of the **ODVA** deployed 6091 infantrymen and 1599 cavalymen supported by 88 guns of caliber 76.2mm and larger (not counting regimental weapons), 32 aircraft, 3 armored trains, and 9 T-18 tanks. (There were 10 T-18 tanks in the Chita area in the fall of 1929, one of which was heavily

damaged during unloading and had been disassembled into parts for the repair of other tanks.)

Organizationally, this group was comprised of the 21st Perm Rifle Division (in Chita), 35th Rifle Division, 36th Transbaikal Rifle Division, 5th Cavalry Brigade, Buryat-Mongolian Cavalry Division, a separate tank company, 6th Aviation Detachment, 25th Aviation Detachment, 26th Bomber Squadron, 18th Artillery Battalion of corps artillery, 18th Engineer Battalion (in Chita), and 1st Railroad Company. Command of the group was entrusted to S. Vostretsov under the general guidance of the **ODVA**, which was commanded by V. K. Blyukher.

The Chinese erected field fortifications in the area of Dzhalaynor station. They covered the road to Abagaytuevsk with three lines of full-profile trenches, between which were constructed good shelters. These shelters had roofs made of rails and ties and were filled in with 1 metre of frozen soil. But these fortifications were weaker from the south, where there were two lines of trenches, and from the east where there was only a single trench line in places. The key to all of these positions in the area of Dzhalaynor station and Dzhalaynor mines was Height 269.8, which covered the approaches to the station from the east (with the taking of this hill by a bypassing column the station fell). The Chinese anticipated the employment of tanks or armored cars on the axis of the main attack. They encircled their positions here with an antitank ditch 3-4 metres wide and 2.5 metres deep. A portion of the artillery was designated for firing in direct lay. A large portion of the infantry was equipped with grenades (the Chinese did not erect any multiple-row barbed wire obstacles as some authors have contended).

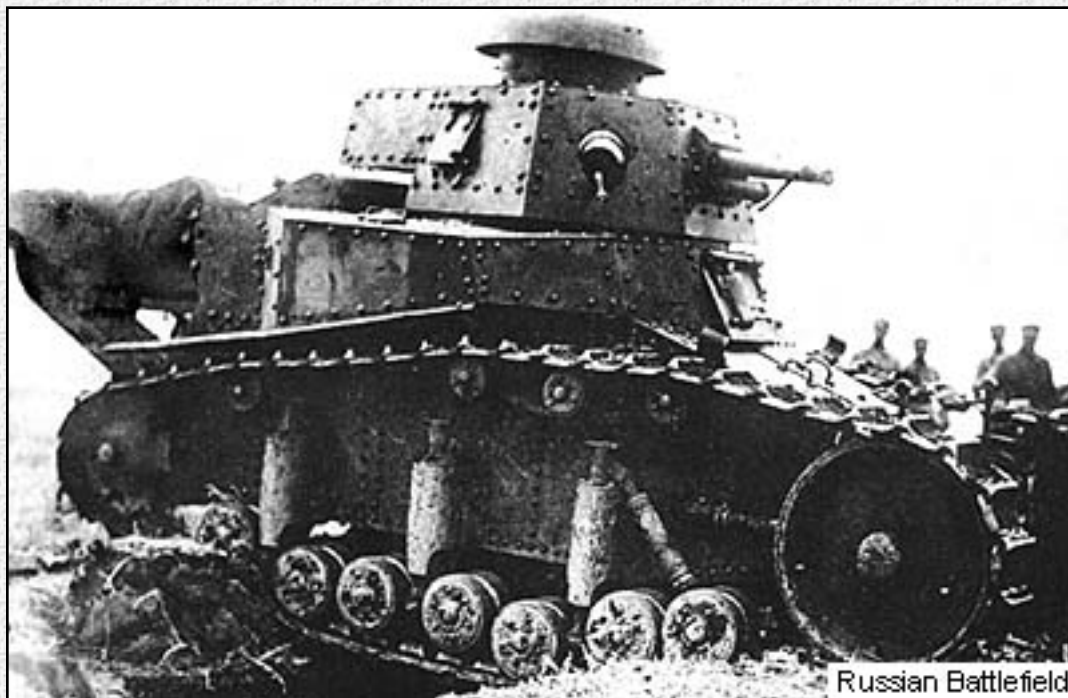


Landing of amphibious assault in 1930 maneuvers. (G.Petrov)

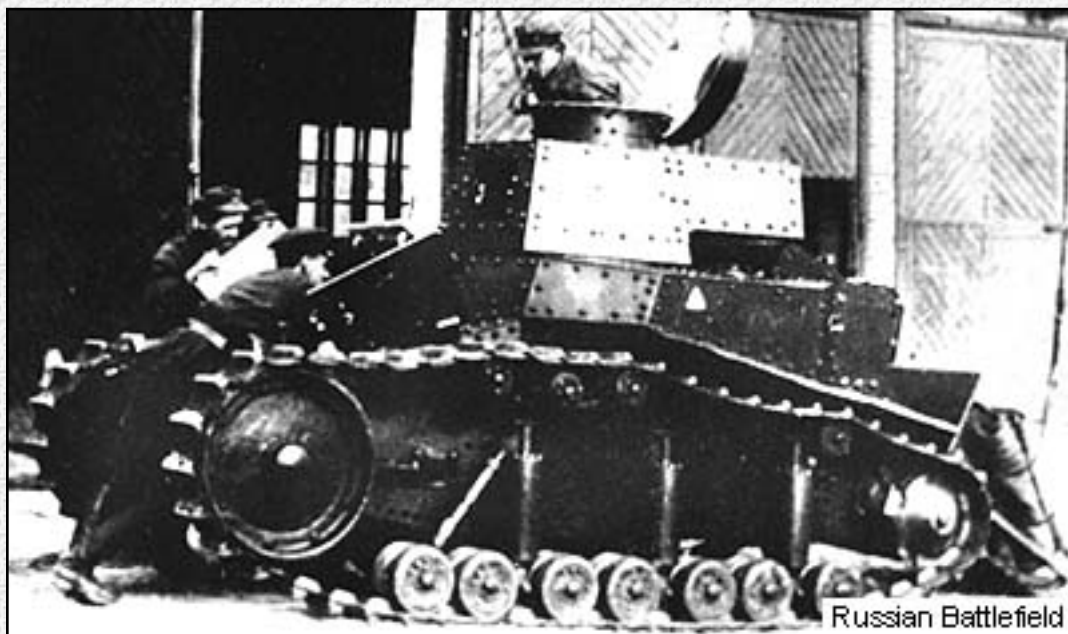


River crossing on wooden bridge, Siberian Military District, Yurga, 1932. (CMVS)

The group commander, S. Vostretsov, underestimated the enemy and therefore did practically nothing to prepare his forces for battle. During the three-month standoff he did not even undertake aerial reconnaissance of the Chinese positions. As a result of this failure, during the course of the battles the Red Army soldiers encountered enemy fortifications in places where they did not expect them. Thus, until



Overrunning infantry trench, Siberian Military District, Yurga, 1932. (CMVS)



T-18 with triangular tactical marking before exercises. (A.Beskurnikov)

the very moment of the attack they believed that the antitank ditch was the first trenchline, and therefore the soldiers and tanks were not equipped with any mean to overcome it. By the efforts of the group commander secrecy was maintained to an absurd level, which led, for example, to the case where the commander of 36th Division for two hours before his unit's departure had to personally run across the frozen steppe in search of his lost ammunition trucks, to whom he had not issued a clear staging point.

Taking advantage of moonlight, units departed on 16 November at 11:00 p.m. and began moving out to jumping-off positions. All roads and fields were covered with a layer of ice from the previous evening's

precipitation. Orientation (navigation) was extremely difficult, the more so because the commanders lacked experience in conducting night tactical marches. Units that had been designated to bypass Dzhelaynor station became lost. One battalion, moving at the rear of the column, deviated off to the west from the intended route and fell under withering fire of Chinese machine-guns, suffering heavy losses. Regrouping was accomplished too late and by the time it was completed the battalions had to go into battle without any kind of rest.

Even up to the time of departure the tank company had not received any kind of order

for battle, only its final destination. The tanks had not been topped off with fuel and were practically without ammunition. Three tanks did not have their machine guns mounted. The tank company commander did not have a map of the battle area. It is not surprising that during the night march the tank company became lost and only four tanks arrived at the destination. Here they were refueled and received up to 40 rounds (of a combat norm of 96 rounds).

In accordance with the combat plan, the tanks were supposed to support the actions of 107th Rifle Regiment. The tanks that had become lost were not found before the beginning of combat actions. At approximately 1000 the 103d Rifle Regiment and 5th Cavalry Brigade began to attack the northern and southeastern sectors of the Dzhalaynor station defenses. Simultaneously the 107th and 108th Rifle Regiments attacked the enemy on the main axis. It turned out that these units practically did not have artillery support except their organic regiment artillery. It was laughable that comrade Vostretsov assigned a tank company to them (it was actually a platoon). During the attack on the intermediate fortifications the tanks put on a good show attempting to evade the fire of Chinese artillery. They developed too much speed and the Red Army soldiers could not keep up with them. But the objective was achieved and the fortification near Height #9 and "Zheleznaya" ("Iron") fell.

Later, near noon, the tank unit that now comprised six tanks (two of the lost tanks had arrived at 11:50 a.m.) went into the attack at the main line of the western sector of the Chinese defense. Battalions of the 107th Rifle Regiment were thrown into the attack behind them, but the accelerating tanks suddenly halted in front of the antitank ditch. The soldiers moving behind the tanks, who lacked any makeshift means for overcoming the ditch, also stopped. Having exchanged dozens of fruitless shots with the Chinese, the tanks turned to the south and the sector of attack of 108th Rifle Regiment. Despite the good antitank defense here, the Chinese were unable to knock out a single tank because their artillerymen could not have been worse in their firing. The appearance of tanks did not incite panic among them - just surprise, according to recollections of the participants. The Chinese positions literally bristled with binoculars and telescope tubes.



T-18 on maneuvers, 1933. (CMVS)



Antitank defense exercises. (A.Beskurnikov)

Of the tanks that fell behind, all that is known is that two of them got lost and linked up with their group in the evening. One tank fell out with a broken transmission. Two tanks reached the position of the 106th Sakhalin Regiment and, lacking any ammunition, just the same supported with their "tracks and fearsome appearance" the attack of the intermediate Chinese

fortifications near Abgaytui intersection. Here the tank commanders operated with skill and the soldiers took shelter behind them. Two tanks were disabled in the course of the battle but one of these was repaired by evening.

The combat actions on the following day also were not laid out clearly for the tank company. Eight machines supported the attack of 108th Rifle Regiment in the area of "Mother" and "Daughter" Heights. The battle lasted almost three hours. The tanks attempted to assist the infantry, but were unable to do so until the antitank ditch was partially destroyed. Later several machines managed to penetrate into the Chinese positions. One was damaged by grenades but the remainder swept the trenches with

intensive machine gun fire. The onrushing infantry consolidated the success.



Russian Battlefield

Training in crossing water obstacles, 1931-1933. (CMVS)



Russian Battlefield

After the occupation of Dzhalaynor came the turn of the garrison of Manchzhuria station. The tanks again supported the 108th Rifle Regiment. Seven of them remained serviceable. Two could not be repaired. At dawn after an artillery preparation the tanks were hurriedly thrown forward, ignoring the mission of covering their own infantry. But here their appearance was apparently unexpected. The Chinese even ceased fire and looked in shock at these fantastic



Training in crossing water obstacles, 1931-1933.
(CMVS)



Camouflaging a tank platoon, 1932. (M.Svirin)

machines. The tanks crawled to the positions, conducting furious fire from machine guns. One of them came within reach of the objective when Chinese grenades flew toward it. Only the efforts of the onrushing Red Army soldiers saved the crew from death. The driver-mechanic was seriously wounded. One tank burst into the trench and got so stuck it had to be dug out after the battle. Another tank lost a track, which jumped off while the tank was negotiating the ditch.

On the whole the activity of the tank company in the course of the *KVZhD* conflict was evaluated as satisfactory. Also noted was the insufficient training of the drivers, inability of the commanders to remain oriented on the terrain,

and lack of communications between them. Firing from tank cannons demonstrated the unsuitability of the shells against field fortifications. The machine-guns, which were more effective even from the perspective of morale, were of greater use. Desires were expressed to increase the caliber of the tank cannon, increase the number of machine guns, and improve the mobility, speed, and armor of the tank.

But there were also complaints in the tank unit, for example, the report of the deputy chief of staff Lapin, who saw in the tanks only negative aspects and decried the "expenditure of the peoples' money on these toys". He preferred that more cannons, armored trains, and armored cars be produced.

The significant theme that the old tanks had practically been used up was begun in 1938. Because the modernization of the T-18 that was conducted in 1938 did not yield the anticipated results, the matter of their future use became an acute issue. By the beginning of 1938 some 862 T-18 tanks remained of the 959 that had been built. The remainders had fallen into disrepair and were delivered to the scrap yard after the removal of all armaments and assemblies from them. 160 tanks of the Leningrad Military District that had worn out engines had been turned over to fortified districts in 1934-37 for the construction of concrete pillboxes.

The condition of the tanks that remained in units, and especially in training organizations, was horrible. A large part of them simply were scattered about on the territory of the military units with unserviceable engines, transmissions, and so on. A majority of these had been disarmed. There were no spare parts and repair was accomplished only by removing parts from one tank to repair the others. An instruction of the People's Commissar of Armaments of 2 March 1938 decided their fate: 700 T-18 and 22 [T-24](#) tanks were to be turned over to fortified regions of military districts. There it was intended that unrepairable vehicles be used to create fixed firing points. It was recommended to use twin DA-2 machine-guns, two DT machine-guns, or the model-1932 45 mm tank gun for arming of these new pillboxes. The hulls of these machines, along with their engines and transmissions, were to be turned over for scrap metal. Tanks that could still move were partly rearmed with the type-1932 45 mm tank gun and given to fortified region garrisons to be used as mobile firing points.

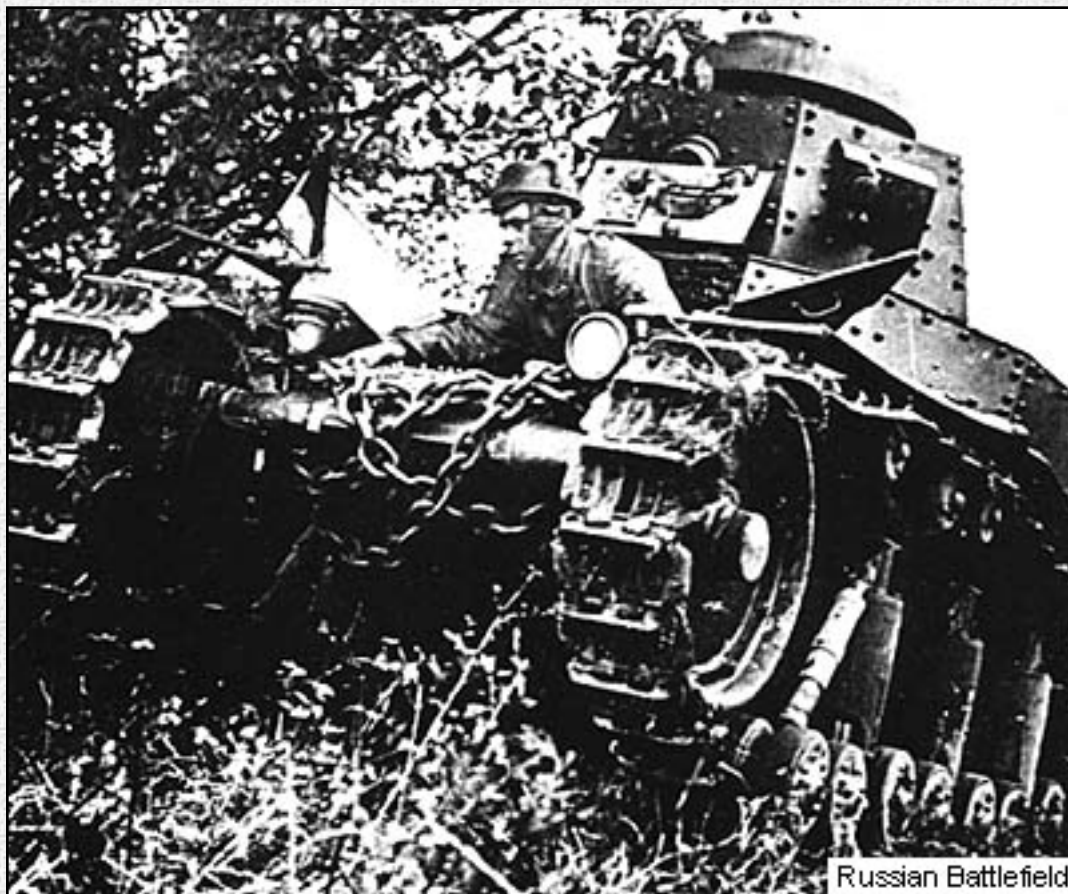


Exercises in tank driving at Orlovskaya Tank School. *(M.Kolomiets)*



Inspection of vehicles at Orlovskaya Tank School.
(A.Beskurnikov)

The majority of the T-18 tanks were not around at the beginning of the Great Patriotic War. Approximately 450 tank hulls and about 160 tanks that could still move under their own power were able to serve in the defense of the USSR. It has been confirmed that in 1941 the Osovetskiy Fortified Region, which occupied approximately 35 kilometres of frontage, had 36 armored turret mounts (including those



The T-18 in ambush, August 1932. (*M.Svirin*)

from the T-18) equipped with 45 mm tank cannons, and also two tank companies (the 1st, consisting of 18 T-18 tanks in the Kol'no area, and the 2nd, of 18 T-18 tanks in the Belyashevo area). In June 1941 the 2nd Company successfully fought with German combat vehicles, a significant portion of which also were light tanks, armored cars, and armored troop transporters.

Vladimir-Volynskiy Fortified Region was supported by elements of

the 87th Rifle Division, which did not have any tanks. However, during the German attack on 22 June, the division was supposed to receive five T-18 tanks at afternoon at Ustilug station. Because these tanks did not have armaments or engines, it was intended that they be given the simplest gadgets for installation of a DP light machine-gun and by 23-24 June placed on the terrain as immobile firing points to cover dead space, defiles, ravines, and so on. The best location for such DOTs was on the reverse slopes of hills. It is known that the tanks were received and set up, but details about their combat employment are not known.

Somewhat more information is known about the T-18 in the 9th Mechanised Corps. On 23-29 June 1941 the mechanised corps participated in the large tank battle in the area of Rovno - Brody - Lutsk, advancing on Kleist's tank group from Lutsk toward Dubno. By 29 June the corps had suffered great losses in equipment. To replace these losses a battalion of tanks came forward from Sarny consisting of the following: a company of 12 [T-26 tanks](#), a company of 15 mixed T-26 and BT tanks, and a company of 14 T-18 tanks with a T-26 command tank. This force also suffered losses. A summary regarding the composition of the mechanised corps on 2 July notes the presence of two T-18 tanks, one of which was unserviceable.

The Minsk Fortified Region also had T-18 tanks. On 23 June 1941 a T-18, armed with a 45-mm gun without engine was established as a **BOT** to protect the bridge across the

River Drut (in the area of Belynichi). The crew of this tank, artillerymen Sergeant Gvozdev and Private Lupov, defended the bridge over the course of four hours and destroyed three German tanks, one armored transporter, and several wheeled vehicles, and also dispersed up to a company of infantry. As a result of their efforts they were put in for award of the Order of the Combat Red Banner.

The last of the known facts regarding the combat fate of the T-18 relates to the battle for Moscow. Nine T-18 tanks participated in battles in the winter of 1941-43 as part of the 150th Tank Brigade, and remained accounted for in documents until February 1942.



Russian Battlefield

The dug-in T-18 with 45mm cannon on the Stalin Line, summer 1941. (RGAKFD)

REFERENCES:

[T-18 Development History](#)

[Specification of Soviet tanks](#)

[Specifications of Soviet tank guns](#)

[The blueprint of the T-18 Model 1927](#)

[The blueprint of the T-18 Model 1930](#)

Translated by:
[James F. Gebhardt](#)

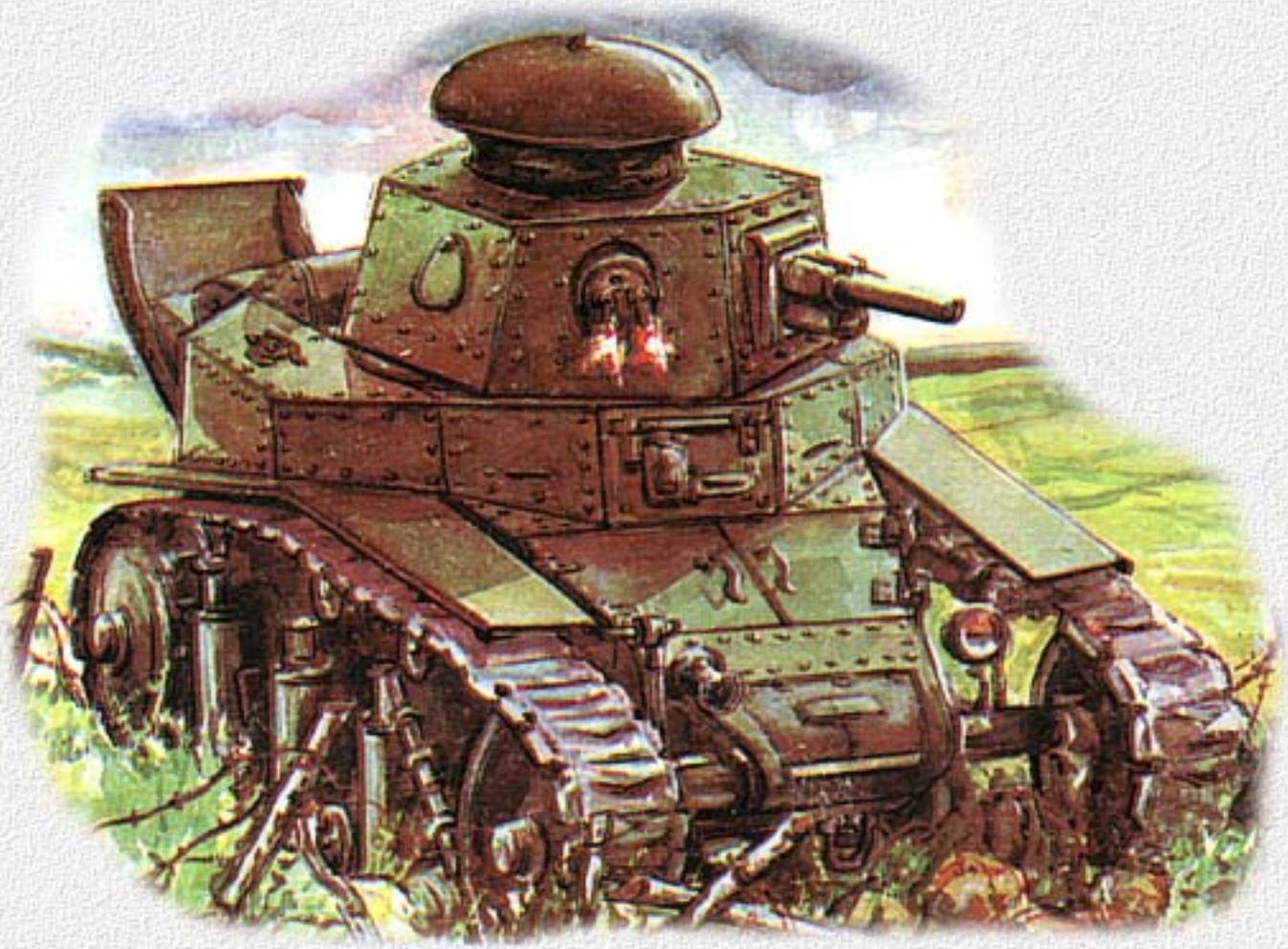
Sources:
A.Beskurnikov, M.Svirin, "Pervye Sovetskie Tanki" Armada #1;
A.Beskurnikov "Pervii Serijnii Tank Malyi Soprovozhdeniya MS-1", Arsenal-Press, Moscow, 1992.

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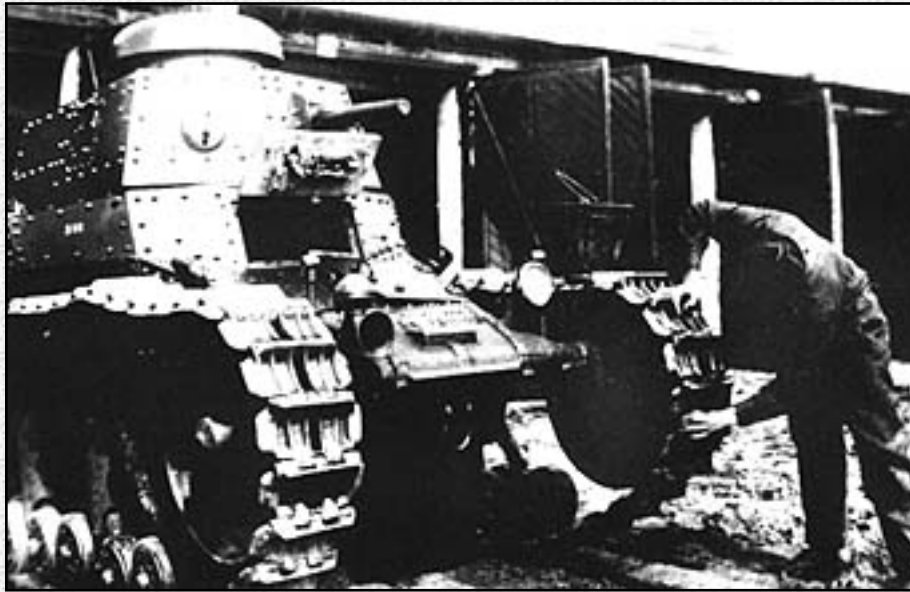
The MS-1 Small Escort Tank

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[WAR](#) [DOCUMENTS](#) [BATTLES](#) [TANKS](#) [ARTILLERY](#) ▶



Construction Features

Armored Hull



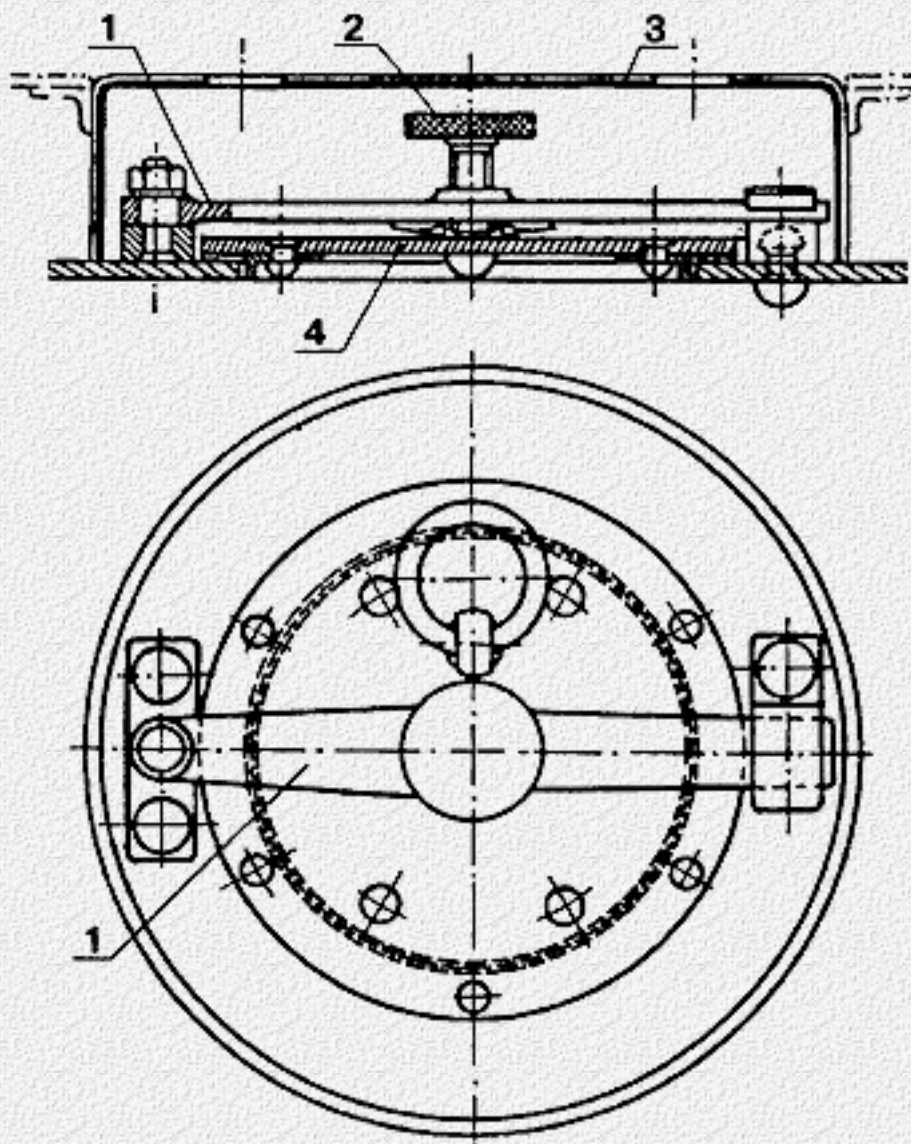
The inspection of the running gear before the trials. *(M.Svirin)*

- fighting compartment;
- driver compartment.

It is interesting to note that the T-18 had a "classic design" with the engine and transmission compartment and driving sprockets in the rear of the hull.

The hull of the tank is of riveted construction, from armored plates of 8-16 mm thickness assembled on a frame. The early production tanks had special two-layered (base and top) and three-layered armor plates produced using the method of A. Rozhkov. Later, in order to economize on production costs of the tank, conventional one-layered armor was employed. The tank was divided into three compartments:
- engine and transmission compartment;

The driver's compartment was at the front of the tank. A tri-fold hatch provided the driver-mechanic access to the compartment. Two of its panels folded back to the left and right. Movement of these panels was limited by latching mechanisms. The front folding shield raised upward and was held in this position by a lock. In the right portion of the shield was a lug for mounting the body of a monocular observation periscope (armored glass). On the left side of the shield was a narrow vision slit. In the event of intensive enemy fire, it could be covered by an armored shutter with two cross-shaped



T-18 bottom hatch:

1. Opening lever;
2. Opening lever release handle;
3. Platform insert;
4. Hatch cover.

apertures. When absolutely necessary the vision slit could be completely covered. Similar narrow vision slits covered by internal sliding shutters mounted in the forward slopes provided a panoramic field of view of the battlefield.

Brackets were mounted to the sides of the bow portion of the hull under the idler wheel axle. The purpose of these brackets was to regulate the tension of the tracks with the aid of special anchors located on the sides of the tank. On front left track tension mechanism bracket was a headlight and on the right side a horn. In a combat situation the light folded into the hull of the tank. The rear light was covered with a red glass lens and mounted on the left side of the hull (sometimes on the right above the exhaust pipe). It served not only as a warning device in darkness but also as a light device for guiding a column.

A peculiarity of the construction of the hull was that it was built without any under-turret box. However, on the upper sides of the hull were attached special triangular-shaped "boxes" (the spaces above the tracks), which contained the fuel cells. The filler spouts for these fuel cells were covered by armored caps. For access to the fuel cell, in the rear portion of the "box" was a cover



Refueling tanks. 1931. (*TsMVS*)

secured by three bolts and in addition a securing ring. Upon removal of the bolts the cover opened to the side on a hinge. These "boxes" hanging over the tracks also served the function of fenders in the middle of the vehicle. On the rear of the tank were fenders made from thin metal, and on the front of the tank fenders made from canvas (a small number of tanks produced in the first series had metal or plywood fenders on the front).

A shaped piece of armor plate, which when necessary can be folded downward on pivot pins to provide access to the engine compartment, covers the engine-transmission compartment of the tank. On top of the engine compartment cover, which can be folded upward and forward, is mounted a cowl with a slotted opening oriented toward the turret. Its purpose is to permit cooling air into the engine and simultaneously protects the engine compartment against penetration by enemy fire. The rear portion of the hull has a shaped recess, which on the backside is covered by a metal casing with a row of small-diameter holes. Heated air from the engine compartment is directed toward these holes by a directional flue and is released outside the tank. This flue can be closed by a door to retain the heated air for engine warming. A vertical armor plate positioned in front of the metal casing from the motor protects the motor against damage from projectiles and shrapnel.



Inside the hull the fighting compartment is isolated from the engine compartment by a partition. This partition has a bi-folding door with lock for accessing the engine compartment from inside the tank. On the partition also are mounted taps for shutting off the flow of fuel from the right and left tanks and a tap for regulating the fuel flow to the engine by pressure pump or gravity.

Repair of a tank in field conditions. 1931.

(TsMVS)

In the bottom of the hull under the fighting compartment is a hatch that permits the discard of expended shell casings and the removal of water that has fallen into the hull. The hatch is closed with a cover and is held by a lever that is secured by a hand-tightened release. For ease of work in the tank the top of this hatch cover is covered by a platform insert (to bring the hatch up to floor level).

On tanks of initial production there is also a hatch in the hull bottom under the engine area, however it provided small benefit and based on instructions from the OAT (Ordnance-Arsenal Trust - a central design directorate for weapons and combat equipment) dated 14 February 1930, this hatch was deleted from the design.

To the rear portion of the hull was attached an extension-a "tail", which permitted the relatively short tank to overcome broad trenchworks. Two attachment loops were welded to the lower portion of the rear hull and one loop on the front hull for evacuation of the tank should it become disabled or mired.



Cleaning of the tank after maneuvers. Summer 1932. *(TsMVS)*

Turret



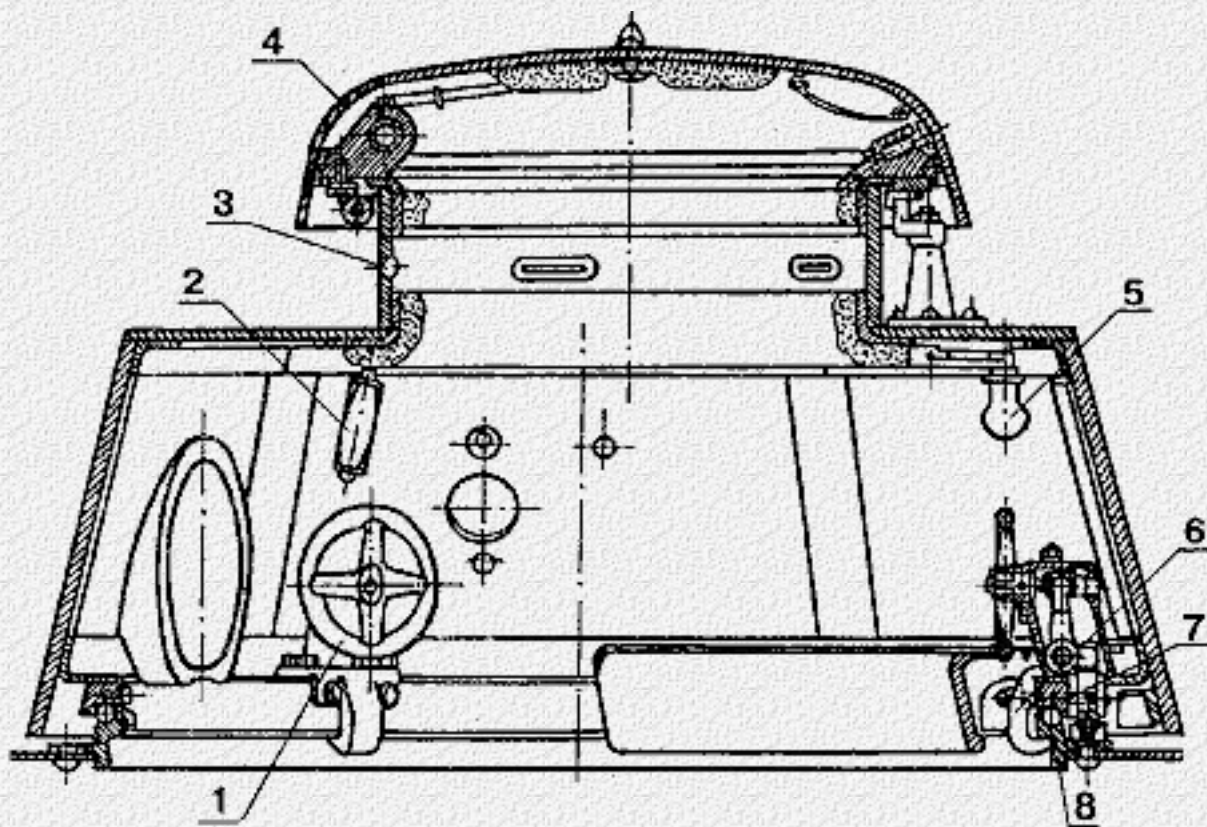
Installing a jack. (TsMVS)

The tank's turret was riveted, and initially had an almost rectilinear six-sided shape with inclined walls. It rested on the sub-turret armor plate through a bearing race and rotated by means of a manual crank. On the back wall of the turret was a backrest, on which was hung a broad strap that the commander used for a seat. The turret was held at the desired position of rotation by three stops spaced equally on the turret ring, two in front and one at the rear. On the roof of the turret was an observation cupola with hatch cover that opened on hinges. Springs were contained in the hinge that helped to open the hatch and a latch was installed to hold it in the open position. Ventilation holes were formed around the perimeter of the hatch base that could be covered when necessary with a sliding circular shield. Observation slits in the vertical walls of the cupola were provided with leather facings to protect the commander's face against

bruising, and the cupola itself had a ventilator hole covered by a sliding shield of a teardrop shape where the cupola was joined with the turret roof.

The shape of the turret was changed when the tank was modernized. Additional space was added at the rear of the turret for the installation of a radio set. The recess was closed from the back by a folding cover that permitted installation and removal of the radio and weapon (actually, a portion of the ammunition stowage was in this space). The shield for the ventilating portal of the turret became rectangular and now folded upward on hinges. The new turret was 140 kg heavier.

The tank's armament, consisting of a 37mm Hotchkiss cannon and machine gun, was located in the forward portion of the turret. The cannon was located on the left side in a rectangular opening and the machine gun on the right side in a ball mounting. When necessary the machine gun could be shifted to a hull opening that was located on the left rear face and covered in normal conditions by an armor plate.

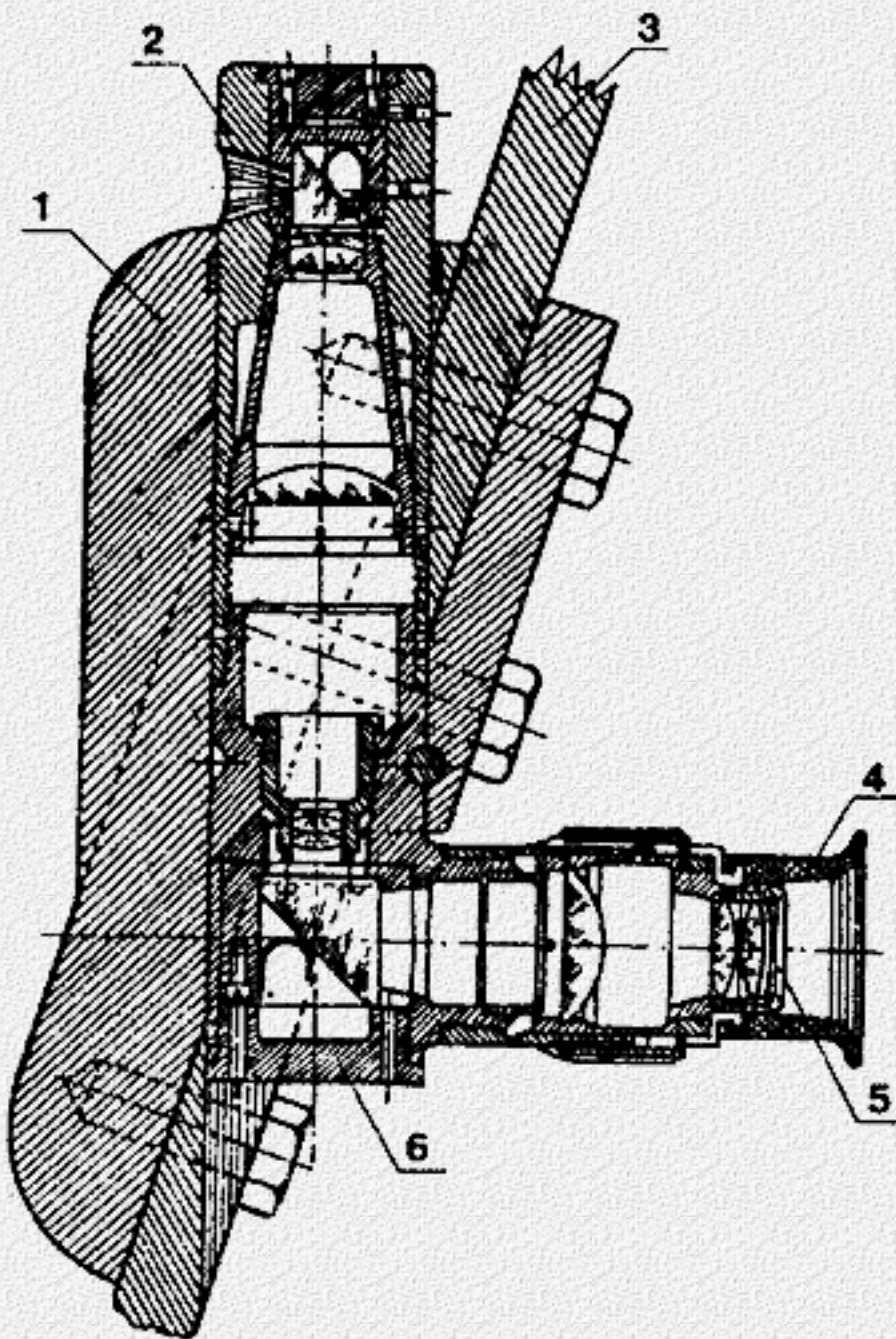


Turret of T-18 tank:

1. Turret brake;
2. Handle for rotating turret;
3. Vision slit;
4. Cupola hatch cover;
5. Cupola hatch cover handle;
6. Turret race mount;
7. Upper turret ring;
8. Lower turret ring.

Armament

Initially the artillery armament of the tank consisted of a 37mm Hotchkiss cannon. The weapon's barrel, with a length of 20 calibers, was borrowed from a naval cannon of the same name, but the wedge-type breech had a different design. The recoil mechanism consisted of a hydraulic compressor-brake and recoil spring, assembled together. Officially the cannon was accepted for armament in the Red Army in 1920 and mounted on the "Russian Renault" tank and several armored cars. The cannon was mounted on the first series of T-18 tanks from old stocks, among which were models that had "reverse" threads (counterclockwise). However in 1928 it was replaced by the 37 mm PS-1 Cannon, made in Soviet Russia and presented as a variant of the Hotchkiss modernized by Peter Syachintov. The striker and firing mechanism in the PS-1 were



"Armored glass" periscope:

1. Periscope protective armor;
2. Armor-protected head;
3. Aperture shield;
4. Eyeshield;
5. Eyepiece;
6. Periscope body.

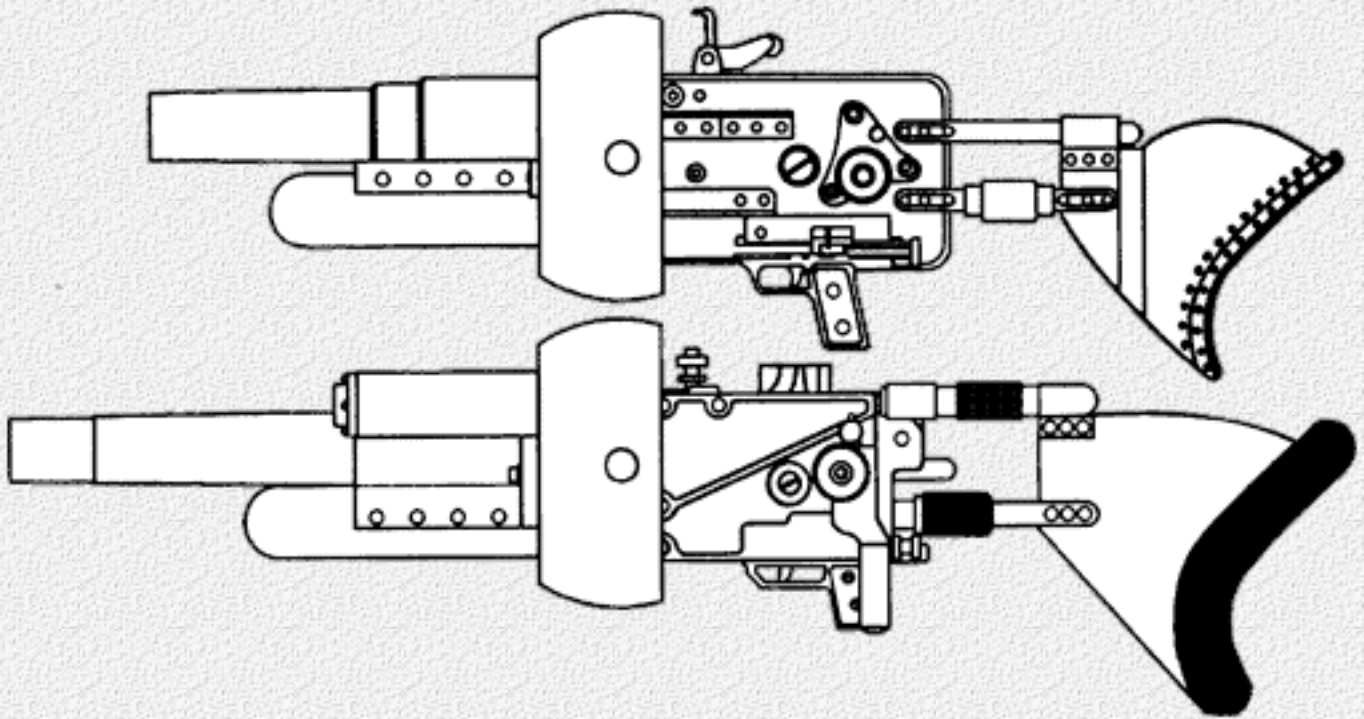
changed, along with the cannon cover. The Soviet-produced version was simpler in production and included a recoil moderator, an equalizer for easing vertical lay, change in shell holder, shoulder rest, and so on.

Single-loading shells which were stored in canvas bags inside the tank were used in the cannon. On tanks of the initial production series, the guns were equipped only with diopter sights. However, in 1929 the Motovilikha Machine-building Plant began the assembly of the 2.45-power optical sight for the 37 mm Tank Cannon with a field of view of $14^{\circ}20'$ and an exit pupil diameter of 2.6 mm. This sight, developed in Leningrad, was mounted on some T-18 tanks produced after 1930.

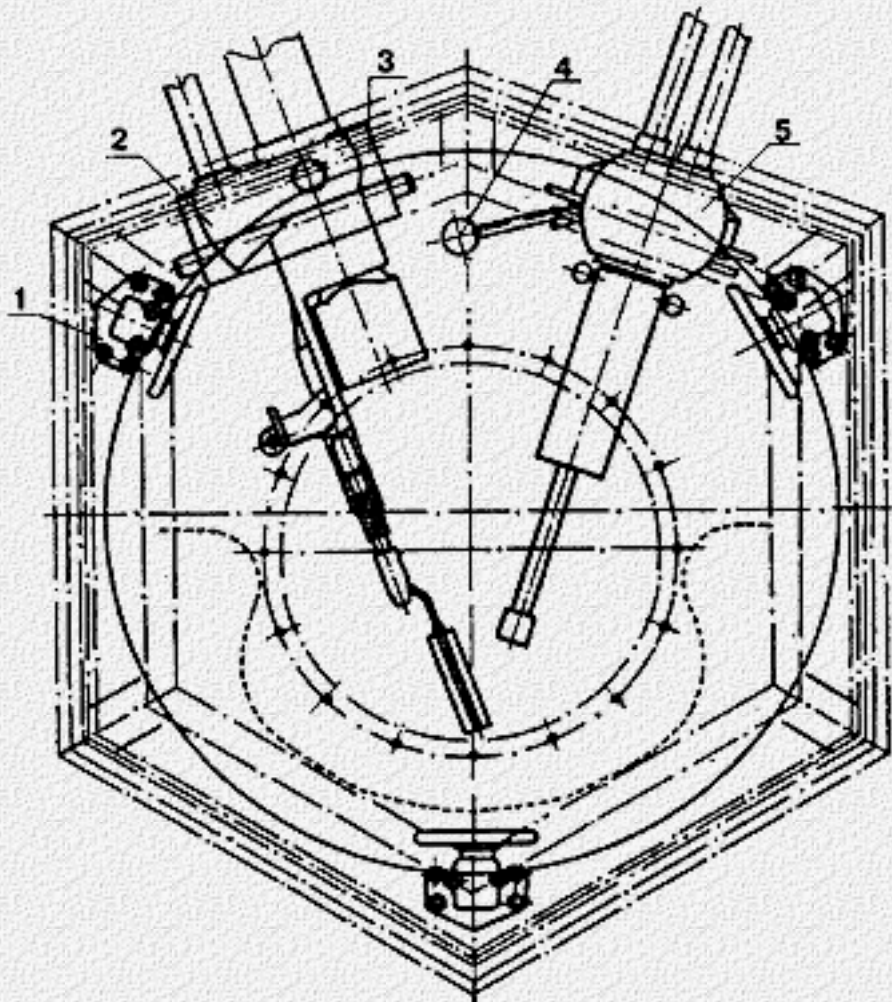
The modernization of the tank in 1929-30 was undertaken to increase its firepower by mounting the more powerful 37 mm B-3 Cannon, produced in accordance with re-worked features by the Rhinemetall firm. This new gun differed in that it had greater firing range and also a semi-automatic breech mechanism. A tank equipped with this new cannon had a significant advantage in armament. Simultaneous with the

mounting of a new gun, which had greater weight than the old gun, the decision was made to balance the turret, which led to the appearance of a new rear stowage compartment. However, the production of the B-3 cannon was not fully underway practically until 1932, and the first tank that received these cannons was the BT-2. The T-18 continued to be equipped with the PS-1.

The machine gun armament of the tank consisted initially of the two-barreled 6.5-mm Fedorov-Ivanov tank machinegun in a Shpagin ball mounting. However the life of this machine gun was very short. In 1930 the Degtyarev Tank Machinegun (DT), which was the basic automatic weapon of Soviet tanks for the next 25 years, was adopted for the arming of all tanks in the Red Army.



The 37 mm "short" Hotchkiss Cannon (upper drawing) and the 37 mm "long" PS-1 Cannon (lower drawing)



Displacement of weapons in the turret of the T-18:

1. Turret brake;
2. Horizontal gun armor shield;
3. Vertical gun armor shield;
4. Machine gun ball mount lock handle;
5. Ball shield.

Engine and Transmission



Repair of a tank engine in field conditions. 1932. (TsMVS)

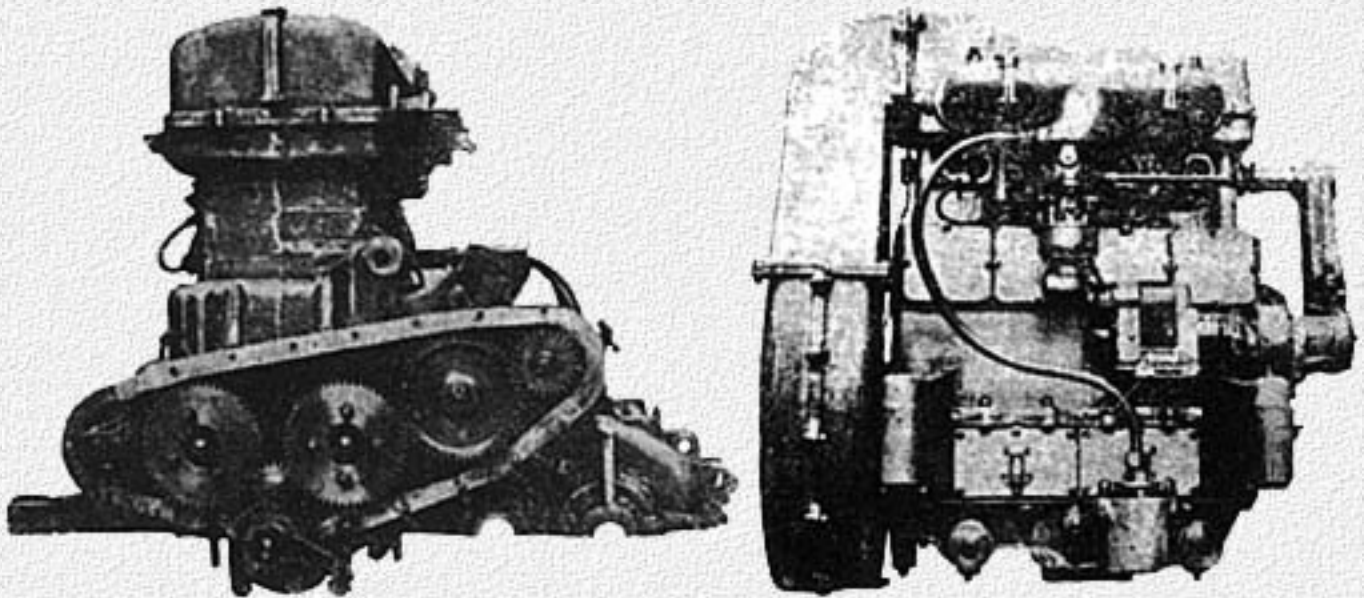
The mobility of this tank was provided by a gasoline four-cylinder, four-stroke, air-cooled engine designed by A. Mikulin, producing 35-40 h.p. In comparison with existing power plants of tanks of that era, it had some peculiarities. For example, ignition was provided by two sets of spark plugs (two spark plugs per cylinder) from a magneto, which ensured that a powerful spark was distributed to each cylinder when the motor was started, and from a dynamo-magneto, which served both for ignition and for supplying the driving lights.

The second peculiarity was the unified engine and transmission in a single assembly and the clutch (primarily friction), which was an absolute innovation at that time.

And finally, the engine was mounted transversely in the engine compartment, which gave the tank a measurable superiority in weight and length compared to tanks that had a longitudinally mounted power pack.

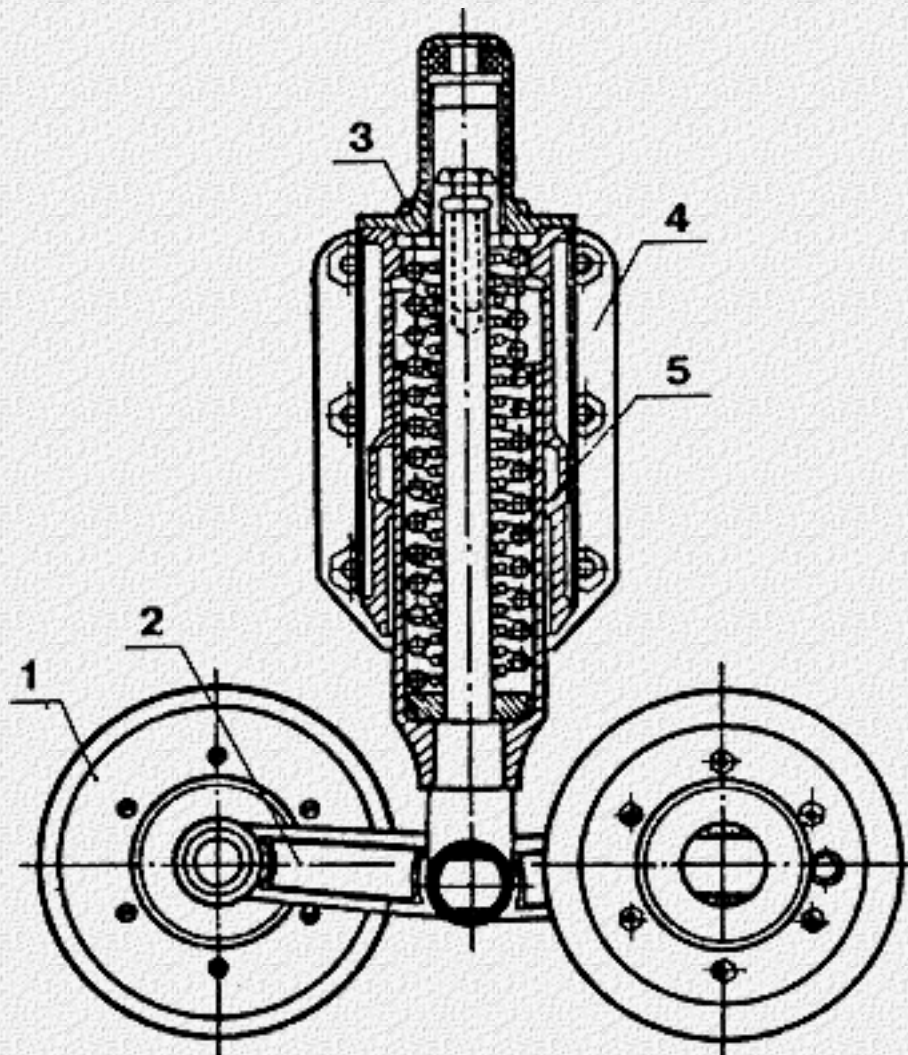
The simple differential was joined to the transmission, on the output shafts of which were mounted gears. Together with drive wheels they comprised the tank's final drive.

On tanks of the third series, the output of the engine was increased to 40 h.p., which together with a four-speed transmission enabled the tank to reach a speed of 17.5 kmh. The first production series of tanks were equipped with Bosch electrical systems and tanks produced after 1930 were equipped with Sintilla electrical systems.



Power pack of T-18 tank. *(M.Svirin)*

Running Gear



Middle carriage of the running gear:

The drive wheel consisted of an aluminum hub with steel rim attached with external and internal teeth. On the outside this wheel was covered by an armored shield. The hub rested on the axle over two bearing races.

The idler was an aluminum disk with a spacer ring and two rubber linings. The idler arm, by which the idler wheel was attached to a bracket on the hull, was elbow-shaped, and rotated in the hull bracket, supporting the track under tension.

The suspension and running gear of the tank consisted of six bogies with shock absorbers and a pair of rollers. In addition, the first pairs of rollers were joined with an additional support roller by a linking mechanism (see

1. Support roller;
2. Balance lever;
3. Shock absorber body cover;
4. shock absorber body;
5. Spring.

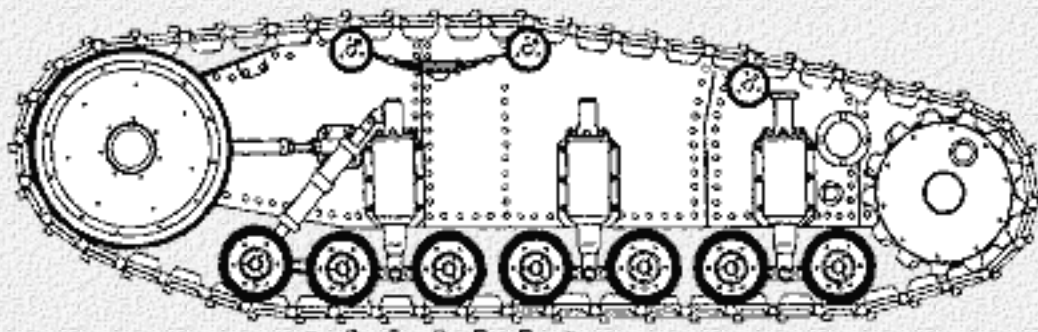
illustration). On early production tanks the design of the forward suspension bracket differed from the two rear brackets by the presence of eyes for attachment of the linking mechanism to the front

supporting roller. Its springing lengthened the moment arm of the suspension mechanism. Beginning in 1930, standardized brackets were mounted.

The upper run of the track lay on four rubber-lined support rollers (on each side). The first three rollers were held up by leaf springs. All the rubber linings of the tank's running gear were manufactured at the plant "Krasnij Treugolnik" (The Red Triangle).

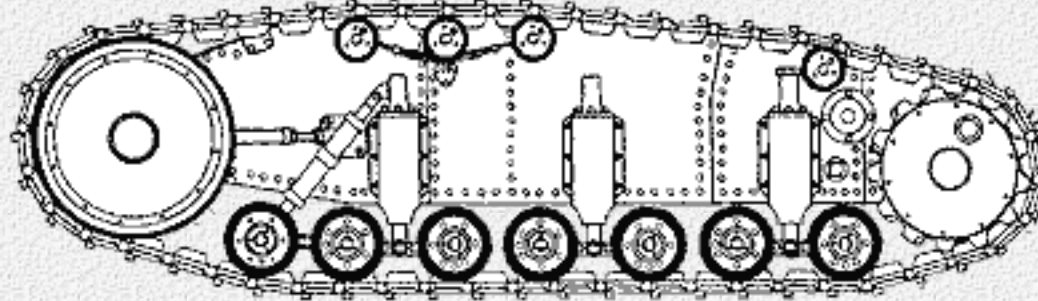
The track of the T-18 consisted of 51 blocks (actually from 49-53). The track blocks of early production were complicated in manufacture. The consisted of a cast base with ears and a ridge for engagement with the drive sprocket. To the outer portion of the block was riveted a steel flange with lateral lap joints for increasing the magnitude of the bearing surface during the tank's movement on soft ground. The top of the flange had a grouser riveted to it to improve traction. The track blocks were connected to each other by a hollow steel bolt. These bolts were contained on both ends by bronze bushings attached with cotter pins.

Beginning in the summer of 1930, tanks began to receive new track made from cast track blocks of the "eagle claw" type, which were highly effective, especially in soft soil.



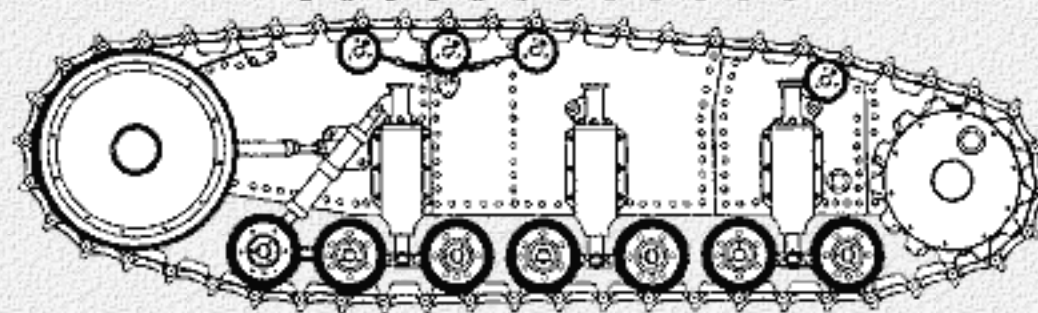
The running gear of the T-18 Model 1927 (early production)

Ходовая часть
Т-18 обр.1927 года
ранних выпусков



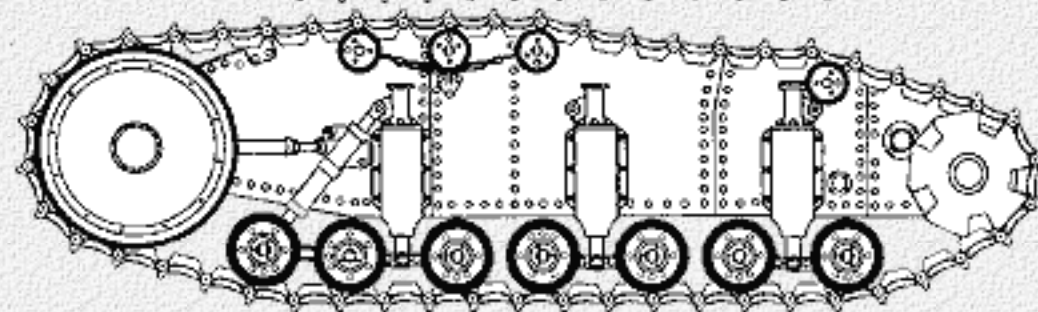
The running gear of the T-18 Model 1927 (later production)

Ходовая часть
Т-18 обр.1927 года
поздних выпусков



The running gear of the T-18 Model 1930

Ходовая часть
Т-18 обр.1930 года



The running gear of the T-18 Model 1930 with the 4-speed gearbox

Ходовая часть
Т-18 обр.1930 года
с 4-скоростной
КПП

Controls for Driving and Communications



Adjustment of track tension.

1933. (*TsMVS*)

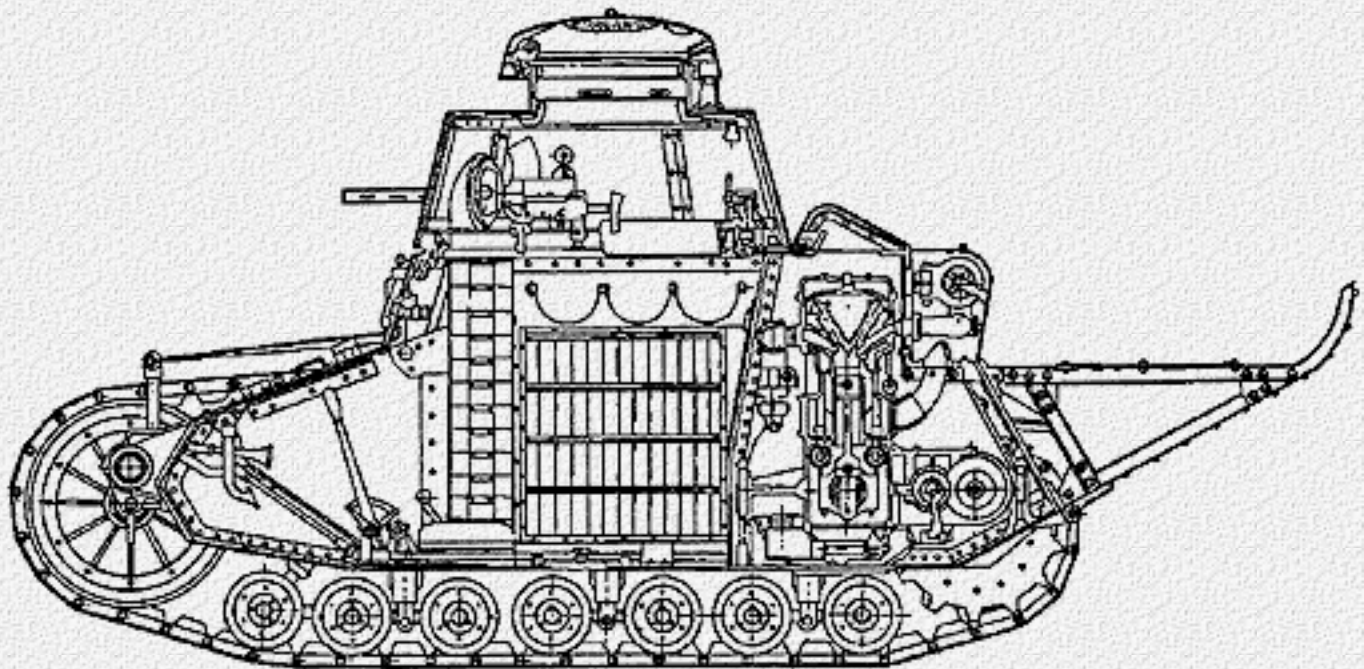
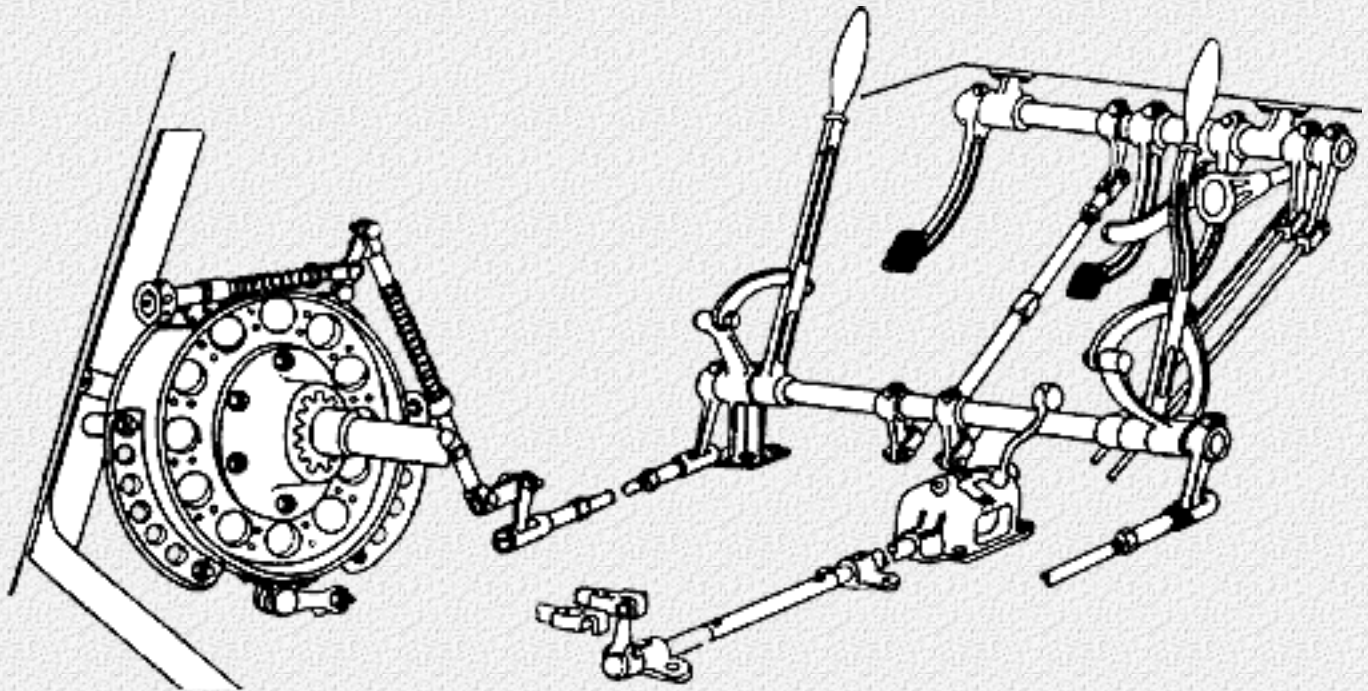
Band brakes were intended for use in turning the tank. They also were employed for stopping the tank to fire and for parking brakes. The brake drum for the left or right track was located on the differential shaft between the differential case and the final drive sprocket. Two levers and a pedal were provided to control these brakes. Both levers or the brake pedal could be used to stop the tank. A toothed sector that held the brake pedal in the depressed position was used for a parking brake.

The gear linkage with lever was mounted under the driver-mechanic's right hand on the floor. The handle for controlling the ignition (linkage to the magneto) was located on the driver's left side.

Gauges were mounted on a plate to the right of the driver-mechanic on the side of the tank. In addition to instruments, on this plate were mounted the central switch for distribution of current between components (running lights,

starter, horn), gauges to monitor oil pressure and temperature in the system and the engine, magneto switch, starter button, inspection and illumination lamps, and horn button. The storage battery was to the right of this plate on the vehicle floor. The light switch was mounted on the lower front slope of the hull.

The tank had no special instruments for internal or external communication. True, in 1929 the OAT issued a tasking to the Scientific Test Institute of Communications for a tank radio set. In particular the institute was instructed in writing to prepare not one, but immediately three radio sets, one each for the ordinary tank, platoon commander, and company commander. These radio sets were created, but not one of them was normally inserted into the space reserved for them because the mounting bolts, brackets, and hardware were not taken into consideration during the issuing of the manufacturing order.



Cutaway drawing of the T-18 Model 1928

REFERENCES:

[T-18 Development History](#)

[Combat Employment of the T-18](#)

[Production vehicles based on T-18](#)

[Specification of the Soviet tank guns](#)

[Specification of Soviet tanks](#)

Translated by:
[*James F. Gebhardt*](#)

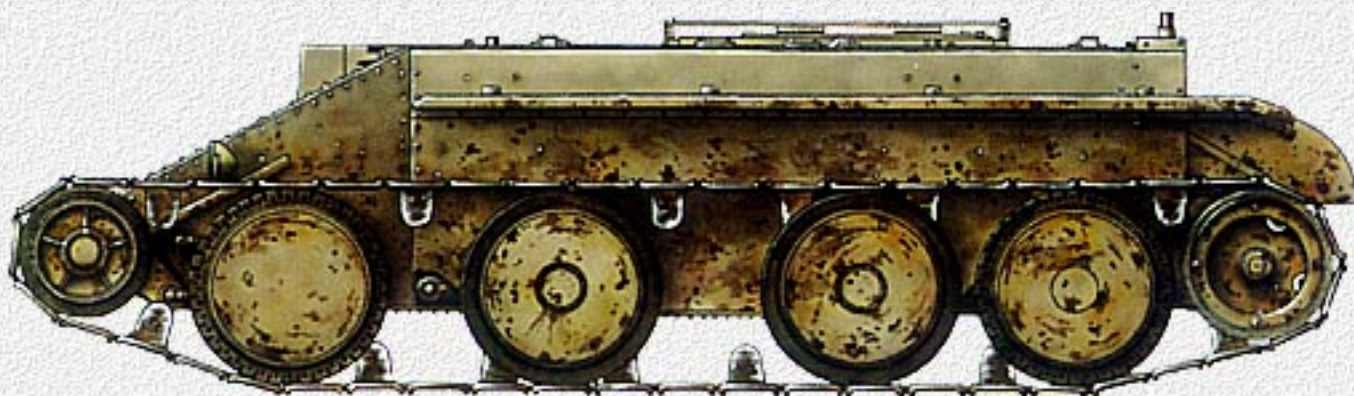
Sources:
"First Soviet Tanks", Armada #1, M. Svirin and A. Beskurnikov
"First Serially Produced Small Escort Tank MS-1", Arsenal-Press, A. Beskurnikov, Moscow 1992

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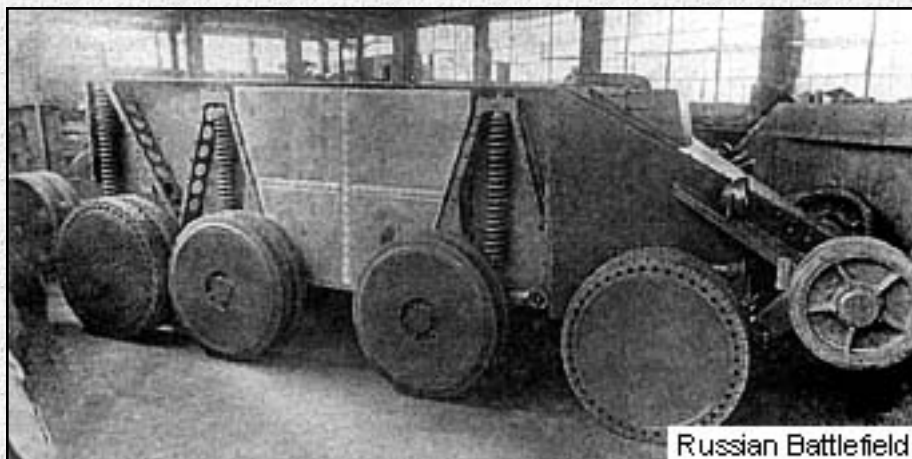
The Christie Tank in the USSR

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Note: All Russian terms and abbreviations shown as *red italic* are described in the [Glossary](#).

The end of the 1920s and beginning of the 1930s was characterized by the gradual sharpening of the struggle between various governments, which brought into greater focus the origins of World War II. Active military preparations took the form of actual growth of armies, modernization of armaments, and the militarization of economies and all aspects of societal life. The primary tendency in the development of armies of this period was their mechanization and motorization, the equipping of forces with tanks, aircraft, automatic weapons, artillery, and mortars.



Assembly of the chassis of the Christie tank, model-1930, at the plant in Rahway, New Jersey, USA

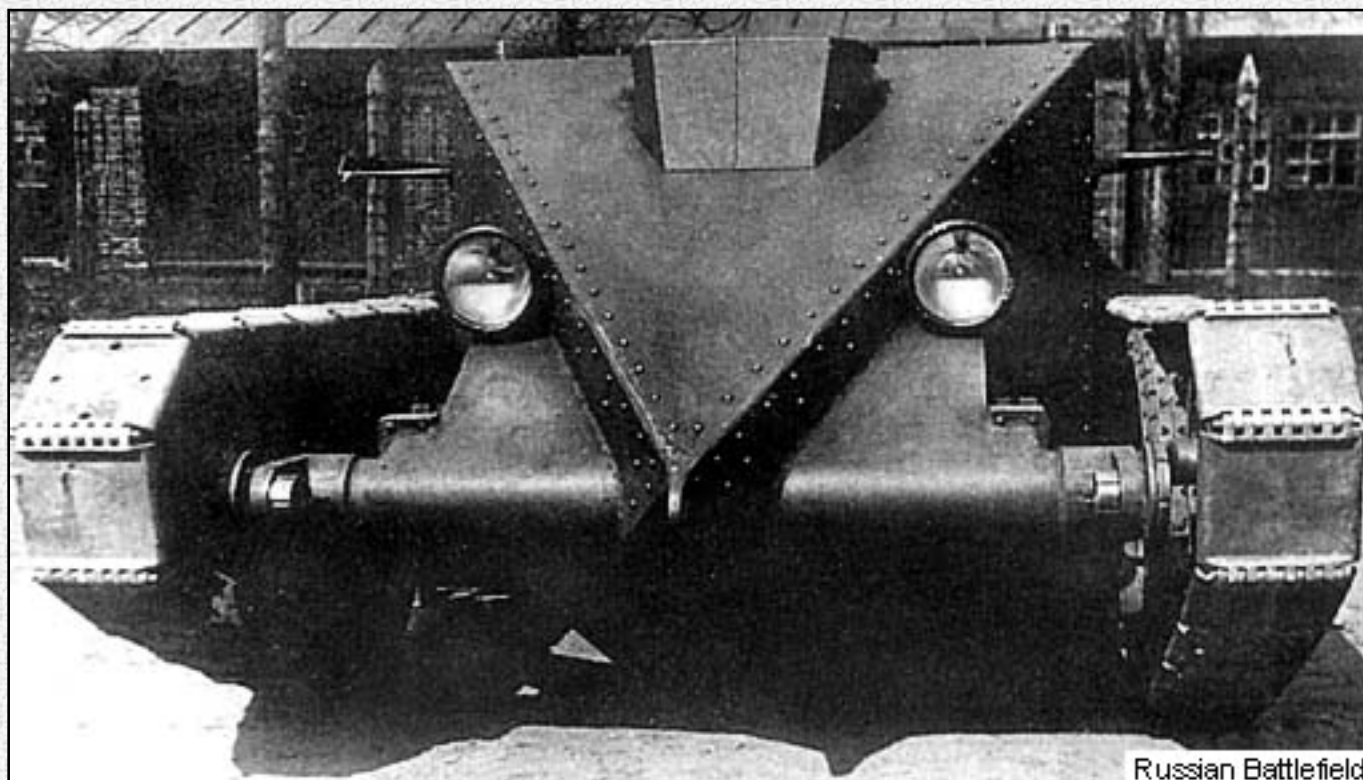
At this time the USSR was forced to take extreme measures to accelerate the development of its own defense industry, to re-equip the Armed Forces and for subsequent improvement of their combat capability. In July 1929 the Soviet government approved the first tank program, the goal of which was to bring into the inventory tankettes, light tanks, armored cars, self-propelled guns, tracked armored transporters, and

other special vehicles.

At the end of November 1929, in connection with the falling behind of our own industry in

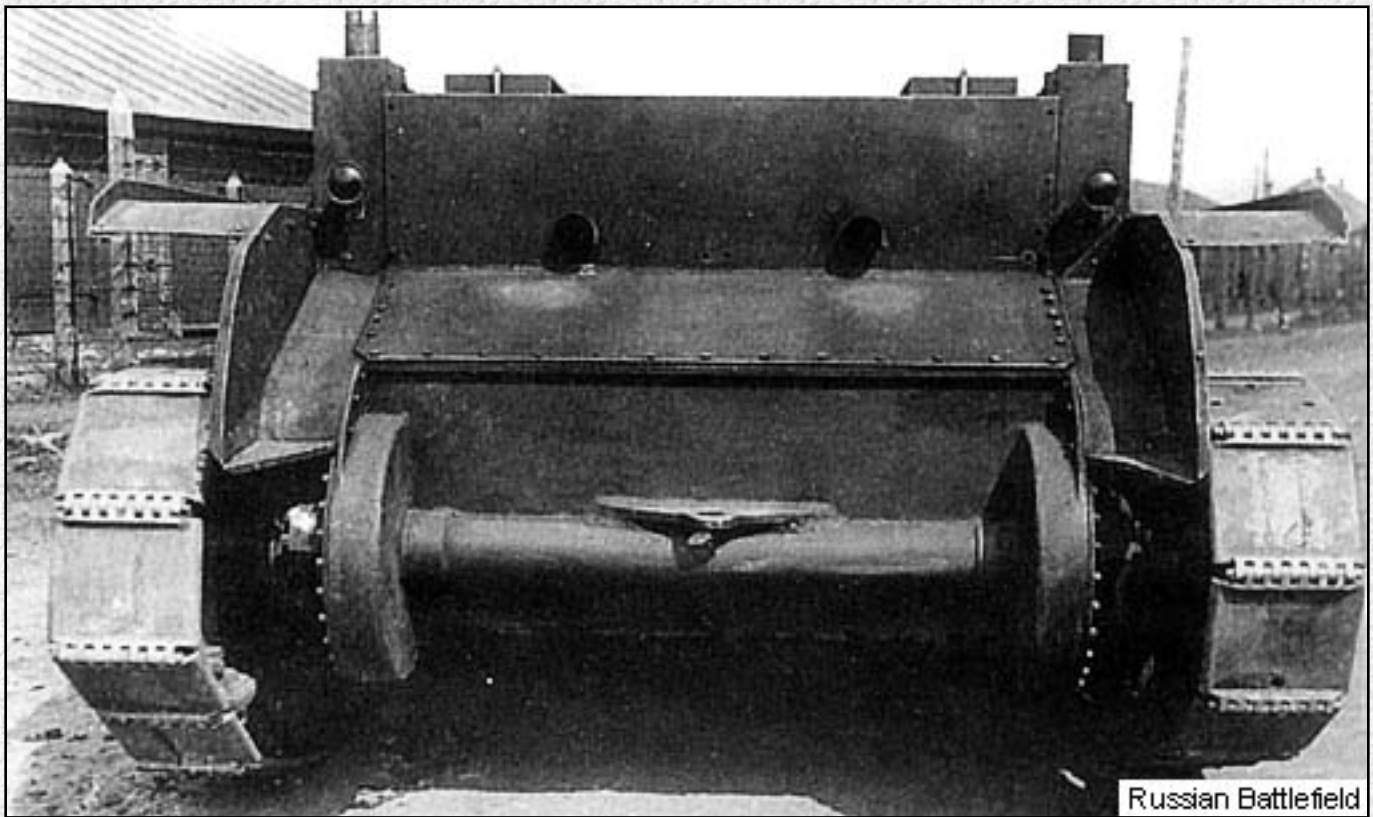
the development of production of all types of tanks that met the armament requirements of the day, the chairman of the *Revvoensoviet* K. E. Voroshilov gave a report to the Council of Labor and Defense. On the basis of this report on 5 December a commission under the leadership of the deputy chairman of the *SNK* G. K. Ordzhonikidze decided to send abroad representatives of the military enterprises and industry to acquire examples of armaments and receive technical assistance regarding their production.

The commission, headed up by the chief of the *UMM of the RKKA*, I. A. Khalepskiy, went abroad on 30 December 1929. Having visited Germany, Czechoslovakia, France, and Great Britain, the commission arrived in the USA for the purpose of purchasing the small tanks T-1 and E-1 from the Cunningham firm. The results of tests that had been conducted indicated that these vehicles possessed a movement speed some 8 km/h less than the English Vickers tank that had already been purchased. The engine and transmission constantly overheated and the enormous tracks were an obstacle to the achievement of the desired movement speed. At the same time, the price of these two tanks was 175.5 thousand rubles higher and the commercial demands of the Cunningham firm were absolutely unacceptable: its representatives set forth conditions in accordance with which the Soviet side was to purchase a minimum of 50 vehicles with a 50 percent down payment. In addition, the firm categorically refused to provide technical assistance or engineers to visit Soviet production facilities. For all of these reasons talks regarding the purchase of these tanks were broken off.



Christie tank, front view.

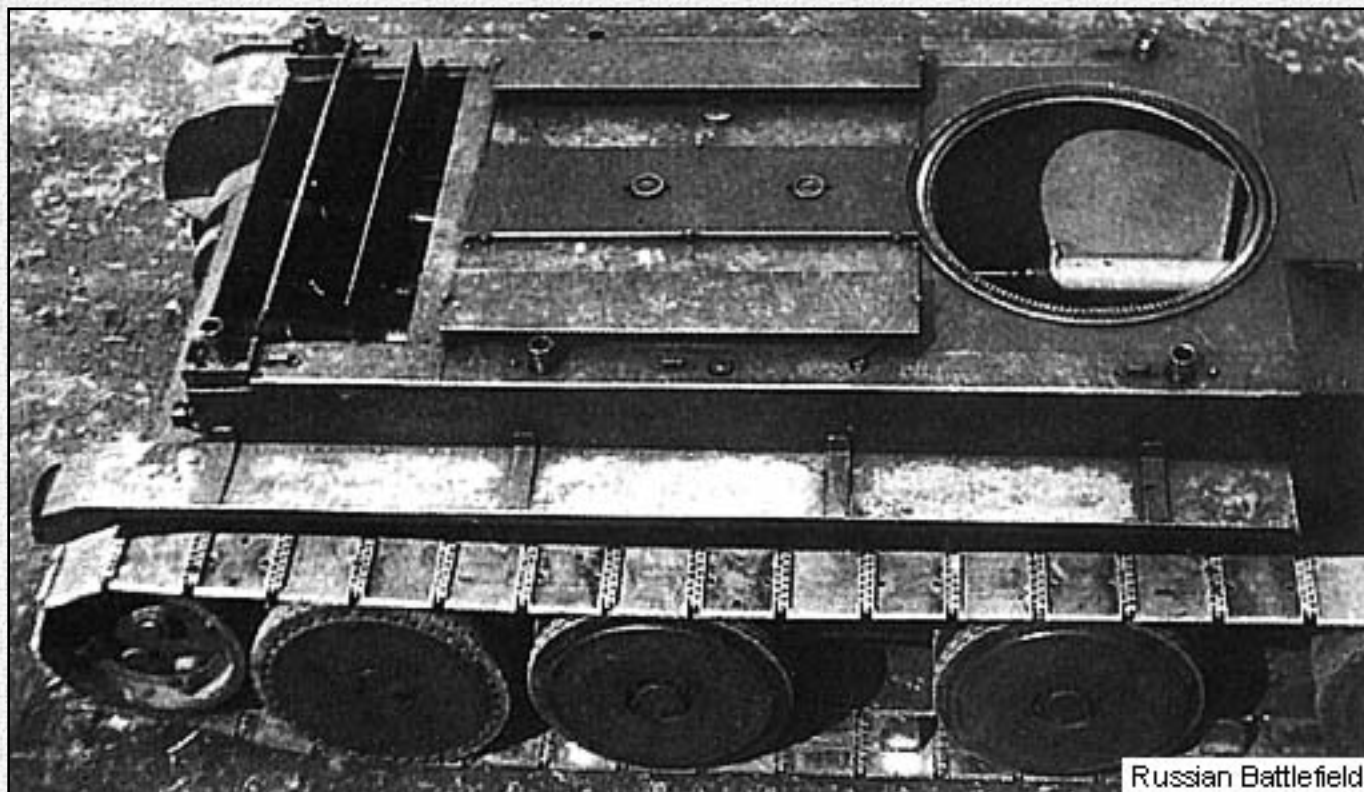
On this same trip the commission representatives became acquainted with John Walter Christie and his fast tank, which at that time was still being designed. Contrary to expectations, the tanks did not make the desired impression on the head of the commission, I. A. Khalepskiy, who at the time was still enthralled with the TG tank designed by German engineer E. Grotte. But just the same Khalepskiy had brought with him a tentative agreement for the possible purchase of a Christie tank. When it came down to securing the ability to produce these tanks, the Soviet government loosened its purse strings.



Christie tank, rear view.

Having agreed on a number of issues, the USSR purchased from John Christie two improved experimental tank chassis, named by the designer the M-1930 (model 1930). Here it should be emphasized that despite what has been written in many publications, not whole tanks were purchased but only their chassis.

The primary reason for the purchase of the Christie M-1930 tank was first of all the technical assistance offered by the firm, and the delivery of all production blueprints and the technological process of the production of the tank. John Christie also expressed his willingness to come to the USSR for a period of two months for consultations and to help organize production. In addition, the firm gave the opportunity to our engineer to work at the plant in Rahway, New Jersey. This technical assistance was not extended for the "Liberty" engine, because these were already being produced in the USSR under license under the label "M-5".



Christie tank, top view.

The issue of whether the sale of the Christie tanks was confirmed in writing or only by an oral agreement has been discussed in various ways in many publications. Judging by available documents, adherents of both sides are correct. Indeed, on 28 April 1930 an agreement was signed between the firm "U.S. Wheel Track Layer Corporation" and **AMTORG** (the trade organization that represented the interests of the USSR in the USA) for the delivery to the Soviet Union of *"two military tanks with a total cost of \$US 60,000. Delivery of the tanks is to be accomplished not later than four months from date of agreement signing."* In the document the parties also agreed to: *"Delivery of spare parts for the purchased tanks for the sum of \$US 4,000, and also the right of production, sale, and use of the tanks inside the borders of the USSR for ten years"* (Russian State Military Archive RGVA, Collection 31811, file 374, sheets 5, 6). Christie was paid an additional \$100,000 for sale of production rights, transfer of patents, and services in the area of technical cooperation. John W. Christie, president of the corporation, signed the agreement on the American side and A. V. Petrov, president of **AMTORG**, signed on the Soviet side in the presence of I. A. Khalepskiy (USSR), John Michael, John Raymond, and Tiffany (all of the USA). Altogether the Soviet Union had to pay the sum of \$US 160,000.

However, there was also an oral agreement between Christie and Khalepskiy. Khalepskiy referred to this in his report about the visit to the USA.

"During my visit with Christie no documents were



**First experimental Christie tank "Original-1"
in the USSR**

signed, but an oral agreement was reached regarding the sale of two tanks to us."

Christie, in his own 7 October 1931 letter to the **AMTORG** director, Gobar, states:

"In this letter I draw for the last time your attention

to the agreement personally reached between Mr. Khalepskiy, yourself, the author of this letter **[Christie - trans.]**, and other members of your commission, who were witnesses to the fact that the contract concluded with me orally should be fulfilled notwithstanding the legal technical requirements and changes."

Based on all of this, it can be concluded that Soviet military personnel indeed reached an oral agreement with Christie for the delivery of tanks. And because at that time the Soviet Union and the United States did not have diplomatic relations, in order to export the tanks without problems a written agreement had to be signed with **AMTORG**, the single organization that officially represented the trade interests of the USSR in the USA.

Having returned from the USA in June 1930, Khalepskiy presented to the **RVS** a report regarding his foreign travel in which the Christie tank was characterized as an extremely fast-moving tank with independent wheel-track movement:

"Taking into account that by its speed the Christie surpasses all other tanks in the world, and that the Poles intend to build it **[here it should be made clear that Poland was considered the most probable enemy of the USSR at this time- Valera P.]**, we could fall into a very unfavorable position from the point of view of tactical employment of

tank units. In connection with this, I urgently recommend that we press ahead with the production of the Christie tank by reducing the production of the Liberty engine in aviation plants and preparing for the production of other components at the Yaroslavl Automobile Plant. I recommend that for the current 1930-31 years we give industry the task of building not less than 100 Christie tanks."

However, despite of some publications state "the Russians were fascinated by genius Christie tank", in this report it estimates quite conservative:

"...Despite of its high speed that, by assurance of the Americans, exceeds 45 km/h on tracks and 70 km/h on wheels... this tank is not good enough to be accepted for service".

It turned out that the Christie tank was viewed rather as a temporary measure for the creation of our own fast tank.



**Christie tank before beginning of testing,
1931.**

The matter of the production of the Christie tank at Yaroslavl Automobile Plant was discussed at an expanded session of the **RVS** with industry representatives, which was convened from 1 to 5 July 1930, under the agenda topic, "Regarding tank issues."

For the purposes of studying the organization of production and control for the fulfillment of the order, a member of the **NTK**, N. M.

Toskin, arrived in New York on 14 July 1930. Making contact with the designer of the ordered vehicles, he received on behalf of Khalepskiy 127 pages of blueprints of the experimental tank and an assurance that Christie intended to come to Moscow with the vehicles.

The blueprints arrived in Moscow on 9 August 1930 and were immediately transferred to the head designer of the main design bureau under the auspices of the State All-union Gun-Armaments-Machine Gun Enterprise, S. P. Shukalov. After copies of these

blueprints were made, on 13 October 1930 all of them were returned to the **ABTU**.

~In accordance with the agreement, Christie was required to deliver two vehicles by September 1930 to a representative of **AMTORG**. But, despite his best efforts, he managed fully to complete these vehicles only by the end of that year. The assembled and tested vehicles were shipped from New York to the USSR in the last days of December 1930.

Meanwhile, on 21 November 1930, the **RVS** of the USSR approved the Christie tank for production. The question regarding the designation of this tank had arisen somewhat earlier, in view of the fact that all designations up through T-34 had already been assigned for three years hence. However, the decision of the head of the **UMM**, expressed in a letter of 11 January 1931, was firm:

"Since the American Christie tank does not meet the requirements of a tank-tractor-armored combat vehicle, and has not been accepted into the inventory, it will not receive the comprehensive designation "T". The suggestion to give it the designation "ST" or "BT" [**skorostnoy tank or bystrokhodnyy tank, both of which mean "fast tank" in English - trans.**] is more rational."

This same decision led to the conspicuous name "Soviet Christie". An order of the **VSNKh** of the USSR was issued on 23 May 1931, which decreed that the Christie tank was to be introduced into the "system of tank-tractor-armored car armaments of the RKKA" as a tank destroyer.



**A Commission examining the Christie tank.
April 1931.**

Both vehicles that arrived in the USSR in early 1931 were subjected to careful examination and testing. In particular, the tank that had the factory number 2051 was received on 4 March 1931 for examination at depot #127 of the **ABTU**. After brief familiarization with the tank by representatives of the **UMM of the RKKA**, on 14 March this test model arrived at the testing department, where, in accordance with instructions of the chief of **UMM of**

the RKKA, familiarization with its technical components and demonstration of the purchased vehicle was conducted until 16 May under the guidance of the chief of the section Gromov and engineer of the tank station Lavrentev. Countless delegations of the leadership component of the *RKKA* were familiarized with the new item from the end of March to 16 April, on the whole creating a good impression on them. Therefore a joint session "Concerning the tank program for the plant for 1931" was convened at the "Bolshevik" plant on 24 April 1931. The list of participants at this session attests to the importance of the question under consideration: K. E. Voroshilov, Tukhachevskiy, Slavin (RVS LVO [Revolutionary Military Council of the Leningrad Military District]), Karpenko (*OGPU*), Litunovskiy, Khalepskiy, Lebedev (*UMM*), Salnikov (plant director), K. K. Sirkin, Zabrezhevskiy (plant technical director), and as well other representatives of the plant and workshops.

The resolution that came out of this session stated in part:

"The plant accepts the order for production in the current year (1931) of 100 "BT" (Christie) tanks under the conditions of supply of its rolled hardened armor, the development of the working blueprints of which will be carried out by a special tank design bureau, which at the present time is completing the working blueprints for the [T-26](#). In connection with the production of the "BT", future output of the [T-18](#) is hereby eliminated."

However these plans would not be realized. In fact, the financial planning commission of the *NKV* noted the production of 150 "TG" medium tanks of the German designer E. Grotte. But because of delay in the preparation of a test model of the new type of medium tank, the deputy chairman of the RVS Uborevich on the suggestion of Khalepskiy decided to order production of 200 [T-24](#) medium tanks in place of the TG at the *KhPZ*. But because a production agreement had not been concluded even by the end of 1931, at the beginning of May, 1932, the Commission for the Defense of the USSR revisited the issue of the possibility of production of the Christie BT at the KhPZ. The selection was not accidental, since the plant's production base permitted practically complete preparation of the tank. By cooperation it was planned to prepare only radiators, conical drive hubs for the transmission and cast parts of high-quality steel. Here it is necessary to note that the *KhPZ* began the organization of tank production from the basis of some experience. The plant staff had gained some experience in the repair of captured foreign tanks already in 1920-23, when the plant repaired



Christie tank on trials. Spring 1931.

approximately 30 captured tanks. The plant had been serially producing "Kommunar" track-laying tractors since 1924 and had now transitioned to the construction of more powerful and modernized "Komintern" tractor. Beginning in 1925 the plant had begun to use gas and electric welding in the production of steam locomotives. The cadre of workers, managers, designers, metallurgists, and technicians had grown during these

years.

On 17 May 1931 order of the Peoples' Commissar for Military and Naval Affairs, the chief of the **UMM RKKA** devised a plan for accomplishment of the government's decision for organization of production of the Christie BT at **KhPZ**. This plan envisioned:

- "1. Preparation of the working blueprints by 15.07.31 (one month) by **SKB** under the supervision of the chief of the design bureau of the armaments combine S. A. Ginzburg using 20 engineers and designers from **GKB** #8 of the armaments combine; 15 engineers and designers from NATI VATO; two hull designers from Izhorsk Plant; from **UMM**, Toskin as deputy chief of the design bureau and Rozhkov as designer for ammunition and turret production; and the full staff of the **KhPZ** Aleksenko tank design bureau. In addition, from 10.06 the director of the **KhPZ** supports the bureau with 30 copiers **[people who reproduced blueprints by hand - Valera P.]**.
2. Five highly qualified specialists from Ukgipromash for development of the technical processes of production of the tank.
3. Assemble the KhPZ BT special bureau by 25.05.31.
4. Prepare three test models by 15.09.31, two by



Christie tank mired in sand

KhPZ and one by the test section of the "Bolshevik" plant with delivery of castings and forgings from **KhPZ**.
5. Preparation of the first run of 100 tanks: 20 by 01.11.31 [1st November - trans.],

30 by 30.12., and 50 by 01.01.32."

(RGVA Collection 4, index 14, file 505, sheet 131)

Practically all five points of this plan formed the basis of the Order of the **VSNKh** #73 of 21.05.31 regarding the organization of production of the BT at **KhPZ** and the creation of the design bureau. The final decision on organization of production of the Christie tank was reflected in Protocol #6 of the Commission of Defense, "Concerning tank design," of 23 May 1931:

"The **RVS** USSR is permitted to introduce the Christie tank into the system of Auto-Armored-Tank-Tractor Armaments of the **RKKA** as a fast tank destroyer (BT).

In ten days Voroshilov and Ordzhonikidze will have to reach final agreement on the maximum number of BT (in existing form, without any changes) that can be produced at **KhPZ** in 1931, bearing in mind the complete cancellation of orders for the T-24.

Simultaneously RVS is obligated to push forward for modernization of the Christie tank."

(RGVA Collection 4, index 14, file 505, sheet 115).

At this time work for study of the first model of the Christie had just begun at the test range. The tank that arrived for testing was a light combat wheeled-tracked vehicle with a classic arrangement. The forward portion of the hull contained the driver's compartment



Towing a mired Christie tank.

with a centrally positioned driver-mechanic. The middle portion of the hull held the combat compartment and the rear of the hull the engine-transmission compartment. The turret with armaments was absent. Entry of the crew into the tank was accomplished through the driver's hatch. The vehicle's crew consisted of two persons. Upon conduct of the technical inspection on 16 May 1931, it was determined that entry and exit of the two crew members was possible in 10 to 20 seconds, but only through the turret opening, because the forward (driver's) hatch was too narrow for passage. The vehicle's armor was sufficient to protect the crew and internal components against small arms fire. The tank's hull was riveted from armor plates with a thickness of from 5.5 to 14 millimeters.

The engine-transmission compartment housed a 400 h.p. Liberty aircraft engine mounted longitudinally.

The driver-mechanic steered the tank with the aid of a detachable steering wheel. However, when necessary the tank could be turned in place using steering levers intended for driving the vehicle when it was moving on tracks. During movement on wheels the tracks were stowed on shelves above the wheels and secured to these shelves with leather straps.

The tank suspension was by individual springs. Each side of the tank housed four aluminum rubber-lined road wheels of 813 mm diameter. The guide and drive wheels for tracked movement had external rubber cushioning. The large-block track, consisting of 46 individual track blocks, interfaced with the drive wheels by means of large, flat "paddles".

An 800 kg ballast was installed in the tank in place of the absent turret with armament during testing. A number of deficiencies were revealed during the first external inspection, such as an absence of vision ports in the driver's hatch, and also the

impossibility of access to the basic power plant assembly and transmission without removing the engine-transmission compartment cover.



Broken right idler wheel mount.

The weighing of the tank with ballast, but without crew, was conducted on 16 May: 9360 kg. Automotive testing of the vehicle was begun on this same day. Over the next 10 days the tank was driven 150 km on wheels and tracks. The tank had been driven an additional 50 km earlier, during plant testing before its delivery to the USSR.

The failure of John Christie to develop his tank design in full was immediately made obvious. On the second day of automotive testing, 17 May, during a turn on grass, the right idler arm mount broke (see photo).

Two subsequent days were spent in repair of the tank. But the welding held for only 500 meters of movement on tracks. On 23 May, after a second broken right idler arm mount, the tank was again sent in for repair, which took three days to accomplish.

The tank was subjected to running on hard surface and dirt roads only on its wheels from 27 May to 13 June. The maximum speed did not exceed 65 to 70 km/h. The impossibility of movement on wheels in sand because of significant miring in the soil turned out to be a substantial deficiency.

The ability of the tank to overcome natural and man-made obstacles was demonstrated to government representatives on 7 June. But a full demonstration of the tank's capabilities was not possible because of the breaking of the idler wheel mount. The tank freely passed over five rows of barbed wire on its wheels, and then overcame a two-meter ditch.

The tank's crew spent 44 minutes in mounting the tracks, and after a



Broken right idler arm mount.

10-minute break spent 35 minutes in removing them and placing them back in their stowage position.

After the vehicle was demonstrated to the government representatives the testing was extended. On 13 June still another, last attempt was made to test the tank running on its tracks. But, after the tank had moved just 1 km, the ill-fated idler arm mount broke again. Three days later the gearbox began to malfunction in 2d and 3d gears.

During this entire period of testing from 16 May to 21 June the tank

was driven 43.5 km on its tracks and 863 km on its wheels.

Some 15 pages of detailed data were collected as a result of testing. In particular, it was noted that the tank failed to undergo complete testing because of breakage of the idler arm mount.

"...The tank was tested only on its wheels, during which it was shown that the average speed on hard surface roads did not exceed 30 to 35 km/h. After 4 to 5 hours the driver was extremely tired (because of difficulty in steering and ride roughness). The engine worked well but frequent adjustment of the valves was necessary. The batteries are inadequate for starting of the engine (as a rule, a cold engine was started by towing).

After 600 to 650 km, 2nd and 3rd gears of the transmission malfunctioned under heavy engine loads. The lubricant leaks under pressure and shifting of all gears is difficult. After 2 to 3 hours of movement the transmission heats up to a temperature of 85° to 88°Ñ in an ambient air temperature of 35° to 40°Ñ.

Tracks. Eight pins broke after 40.5 kilometers.

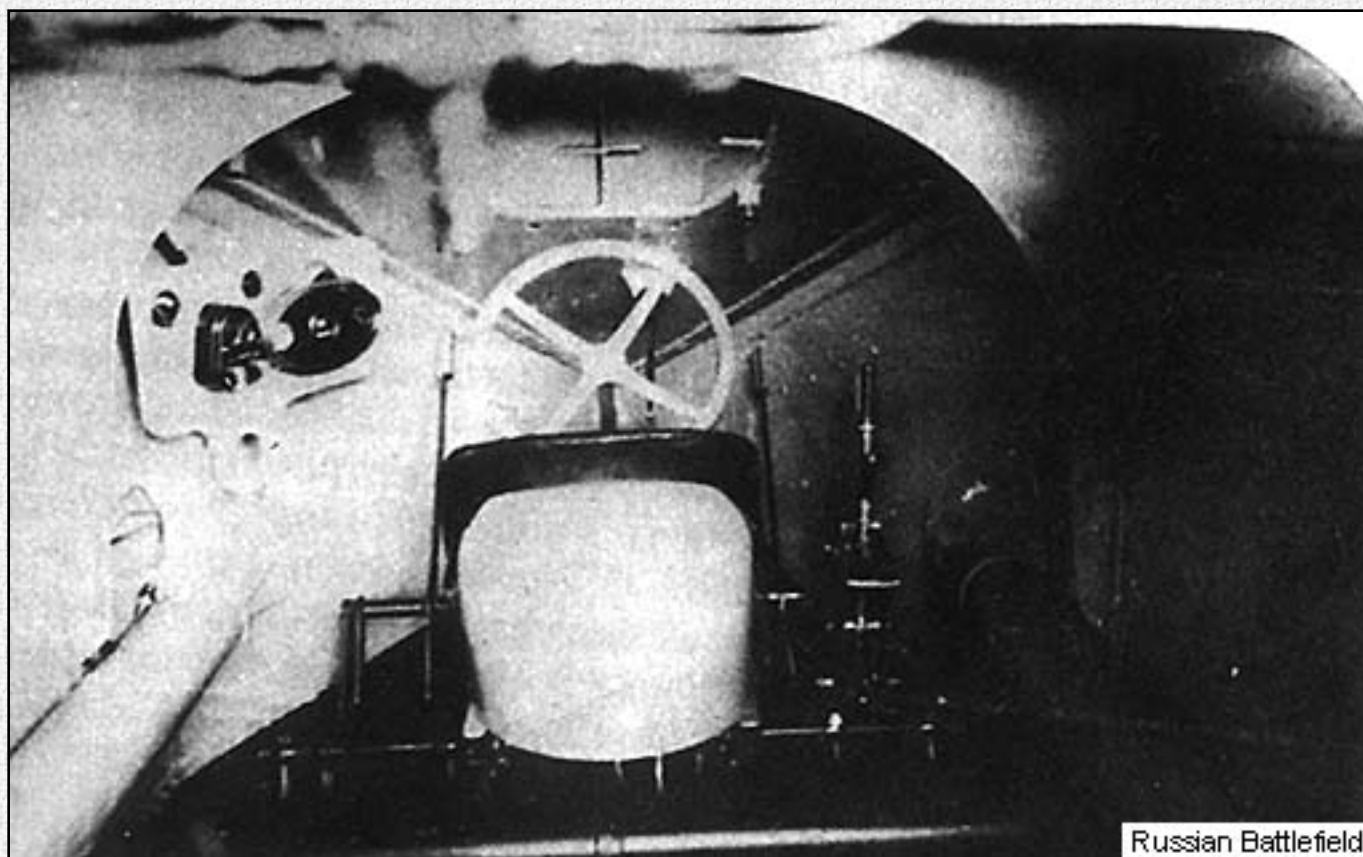
Drive wheels. Disintegration of the exterior surface of 1.5 to 2 cm magnitude was observed after 150 to 200 kilometers.

Tank steering is satisfactory. On dirt roads it refuses to respond to the steering wheel, and during driving on uneven terrain the wheel can be snatched from the driver's hands. The vehicle is difficult to steer at 55 to 60 km/h...

CONCLUSIONS:

The Christie tank in that form in which it was presented for testing is an exceptionally interesting vehicle with universal drive. As a combat vehicle it requires significant development and the introduction of a number of design improvements and changes".

Already at this time, when automotive testing of the experimental model had begun, on 1 June 1931 the chairman of the **NTK UMM RKKA** (Lebedev) sent to the director of **KhPZ** (Vladimirov) a tasking approved by the Chief of **UMM RKKA** (Khalepskiy) for planning of the Soviet production of the wheeled-tracked BT tank.



General view of driver compartment, Christie tank.

Parameter	Christie M1928 (USA data)	Christie M1931 (USA data)	Tank BT Christie (UMM RKKA requirement document)
Year	1928	1930	1931
Crew	3	3	Not less than 3
Combat weight, kg	7 800	10 500	14 000
Length, m	5,18	5,50	not specified
Width, m	2,13	2,23	not specified
Height, m	1,83	2,28	not specified
Armor, mm	12,7	13-16	Front of hull and turret- 20 Side-13 Bottom, roof-6
Armament	2 x 7,62-mm	1 x 37-mm 1 x 7,62-mm	1 x 76-mm anti-assault* (temporary) 1 x 37-mm high power (future) 1 x 7.62-mm DTU

Ammunition	7.62-mm: 3000 rds.	37-mm: 126 rds. 7.62-mm: 3000 rds.	76-mm: 40 rds 37-mm: 100 rds. 7.62-mm: 5000 rds.
Engine	Liberty, 6-cyl., gas, 338 h.p.	Liberty, 6-cyl., gas, 338 h.p.	Liberty, 6-cyl., gas, 338 h.p.
Maximum speed, km/h	112 (on wheels) 68 (on tracks)	75 (on wheels) 44 (on tracks)	70 (on wheels) 40 (on tracks)
Range, km	120/185	240	Not less than 4 hrs.

* Anti-assault cannon was a forebear of the field regimental artillery. Such cannons characterised with relatively small weight.

REFERENCES:

[Specification of Soviet tanks](#)

[Specifications of Soviet tank guns](#)

Translated by:
[James F. Gebhardt](#)

Sources:
Russian State Military Archive, as cited
"Tankomaster" No. 1, 1999
I. Zheltov, I. Pavlov, M. Pavlov, "Tanki BT. Part I", Armada #1
Cover picture by A. Aksenov

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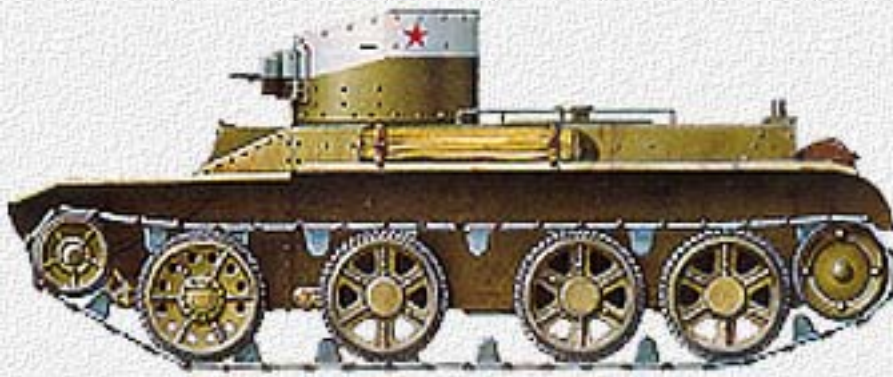
The BT-2 Light Tank

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Note: All Russian terms and abbreviations shown as *red italic* are described in the [Glossary](#).

First production wheeled-tracked tank was named BT-2 and differed from the American prototype by numerous design features. First of all tank had the turret (designed by the A.A.Maloshtanov), also it was equipped with more light road wheels.



The BT-2 armed with one machine-gun.

(M.Dmitriev)

The tank interior was redesigned and some new devices were added. The certain problem was presented with the tank armament. It was supposed to mount a 37 mm gun and one machine-gun, but because of lack of guns all tanks of the first series were armed with two machine guns only. The 37 mm tank gun (with barrel length 60 calibres) was adopted from the 37 mm AT-gun model 1930.



BT-2 with the 45 mm gun and the machine-gun. *(RGAKFD)*

The tank's variant of this gun has been finished only by summer 1933. The first Government order was about the manufacturing of the first party of 350 pieces of the 37 mm tank guns. This plan was assigned to Artillery Factory #8. In that time however, a new 45 mm 20K tank gun was developed and tested, and the further production of 37 mm guns was canceled.

At least four different modifications of BT-2 tank were developed (distinguished by armament):

- The BT-2 tank with one machine-gun;
- The BT-2 tank with three machine-guns;
- The BT-2 tank with 37 mm gun only;
- The BT-2 tank with 37 mm gun and one machine-gun.

The other problem was to choose a proper engine. It is known that the licence on "Liberty" engine wasn't bought. Instead of it, the 2000 engines were bought and shipped to the USSR. When all those engines were out, in USSR was organized the production of similar M-5 engine.

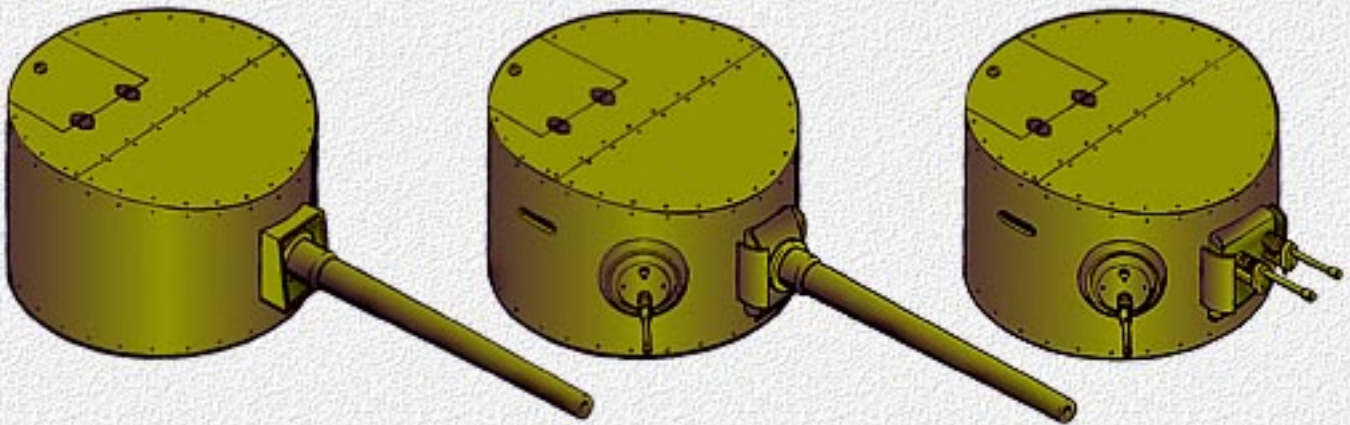


The BT-2's and T-26's on manoeuvres.

(RGAKFD)

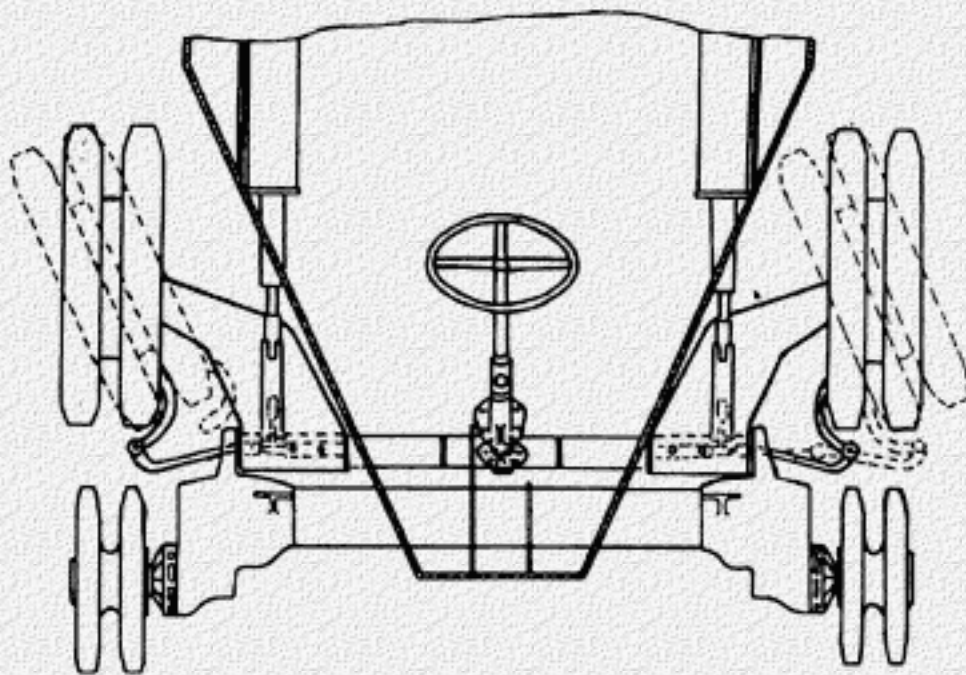
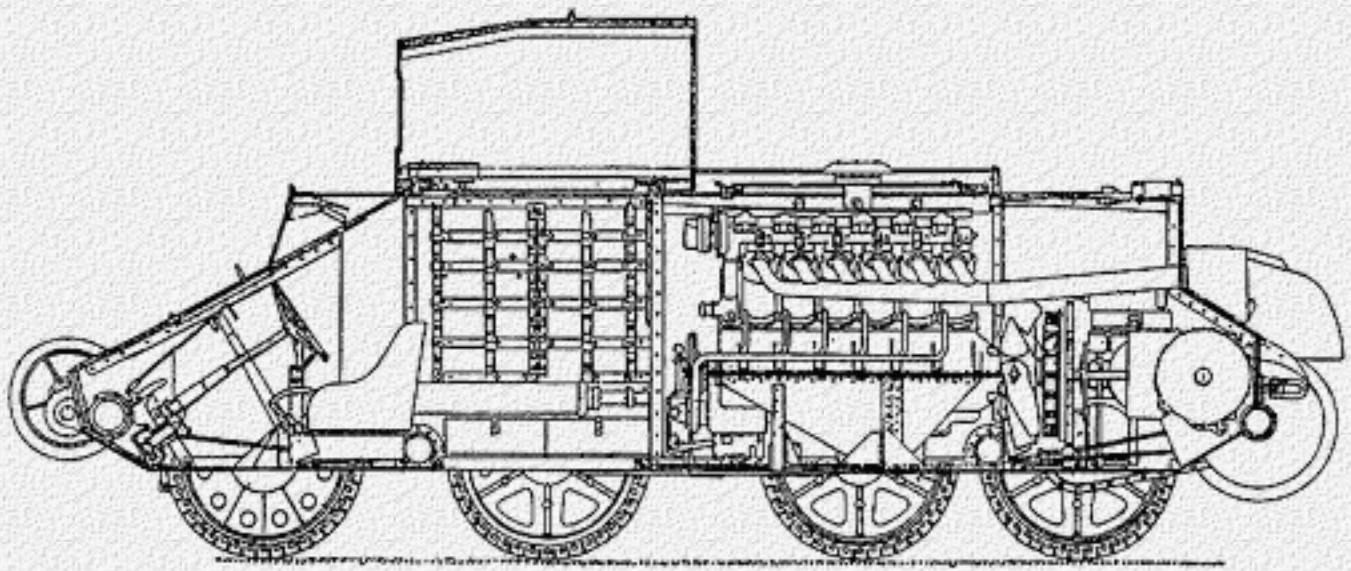
The BT tank could moved up to 52 km/h on tracks, and 72 km/h on wheels. Tank could moved on a wheels only on a road with a firm coverage. This was the quite good tank, however some lacks of design: the weak armament, absence of a communication devices, too little room for the crew. The M-5 engine was capricious, and too complex in operation. Some problems were with fuel system as well.

In 1939, BT-2 tanks took part in campaign in Western Ukraine, and at the beginning of the Great Patriotic War.



Various turrets of the BT-2 tank:

with one gun, with a gun and a machine-gun, with three machine-guns *(V.Potapov)*



The wheeled steering of the BT. View from the top.

REFERENCES:

[Specification of Soviet tanks](#)

[Specifications of Soviet tank guns](#)

Sources:

"Bronekolleksiya" #1 1996

"The BT tanks. Part One", Armada 1998

M.Baryatinsky, M.Kolomiets "The BT-2 and BT-5 light tanks", 1996

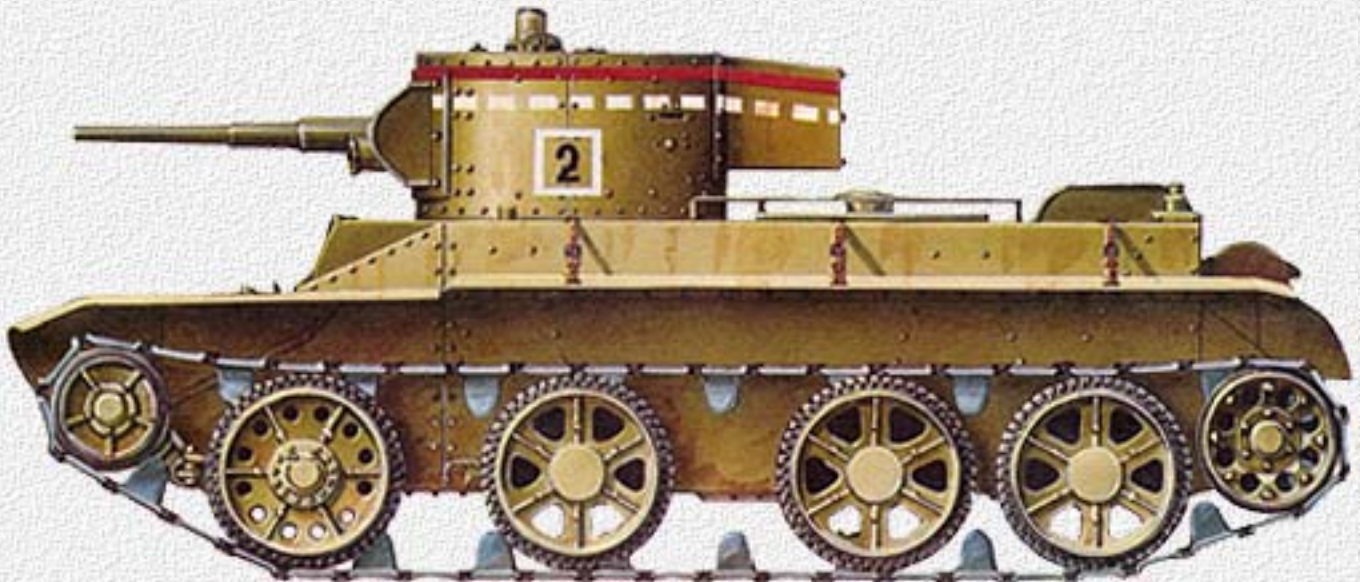
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The BT-5 Light Tank

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The BT-5 light tank of the first series and standard marking of 1930'th.

Note: All Russian terms and abbreviations shown as *red italic* are described in the [Glossary](#).

In the middle 1933 *KhPZ* had changed production from the [BT-2](#) to the BT-5. The BT-5 tank of the first series was just a slightly modified BT-2 tank but with a new turret in which the 45 mm 20K gun model 1932/38 and the DT machine-gun were installed. The turret has become two-men, and the crew has increased to 3 men.



The BT-5 light tank. Spain 1938.

The design of the tank of essential changes has not undergone. The tank weight has been increased up to 11.5 tones. BT-5 was re-armed with more powerful [45mm Tank Gun Model 1932/38](#) supplied with 115 rounds for tanks without a radio or 72 rounds for tanks with a radio. The radio station 71-TK-1 had the hand-rail antenna fitted around the turret. Totally 1884 of BT-5 tanks were manufactured in

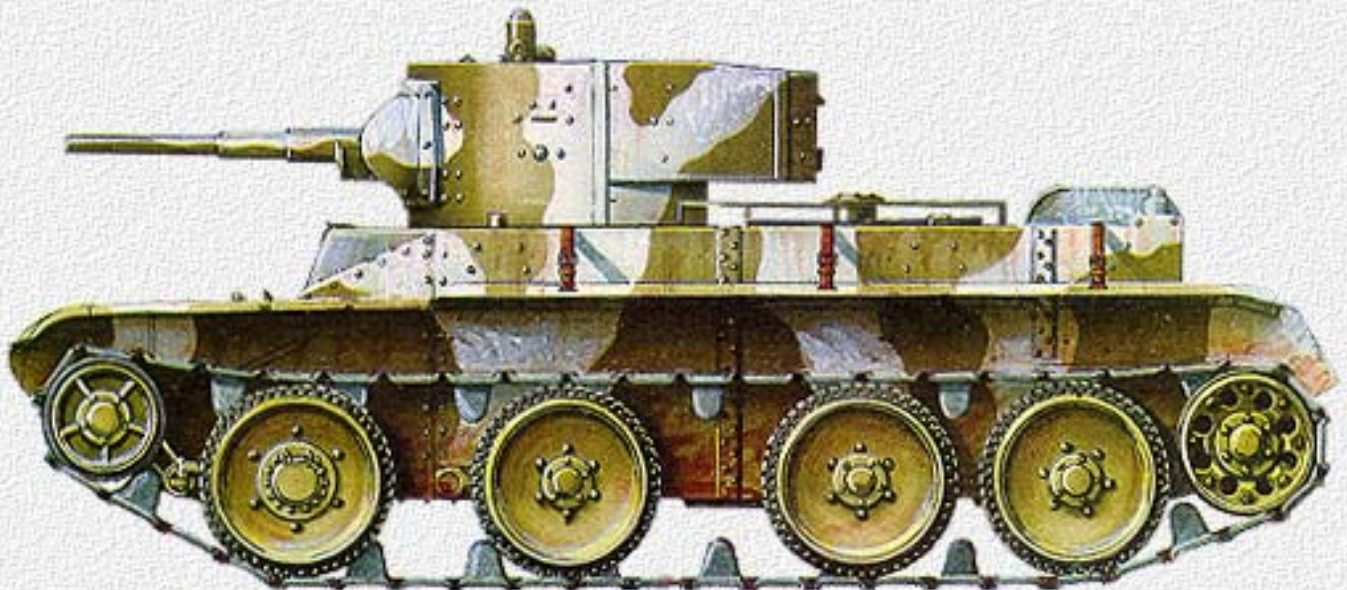
1933-1934.

During production the turret was slightly changed and the wheel roads were replaced with more light ones. These light road wheels were used to modernise BT-2 as well.

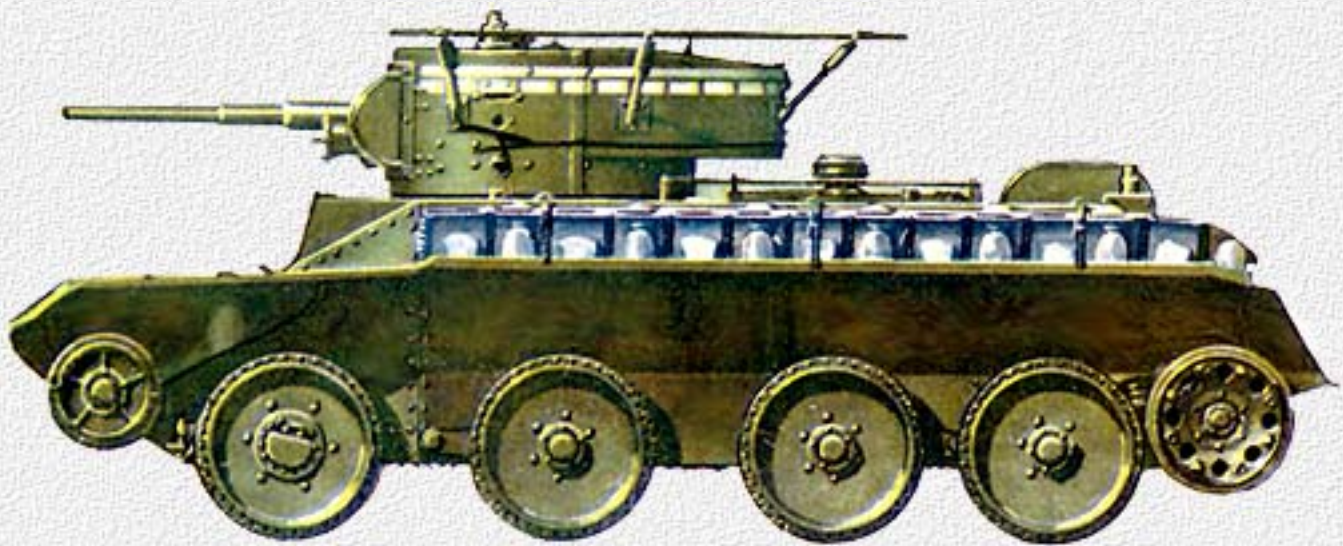


The BT-5 tanks of the 45th Mechanized Corps during manoeuvres. Kiev Military District, 1935.

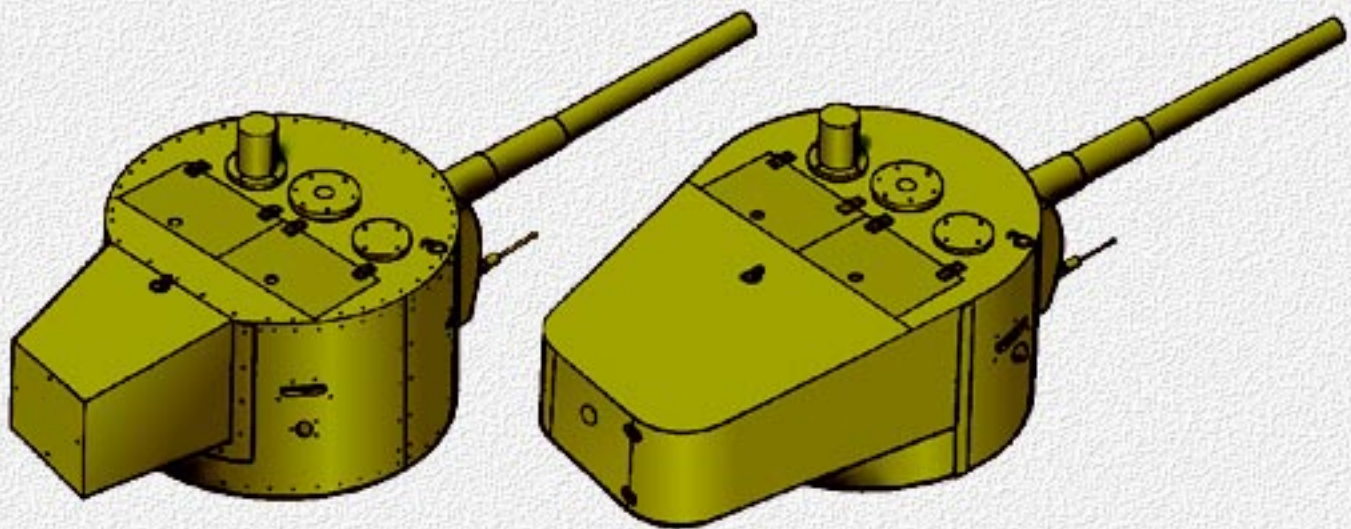
The first usage of BT-5 was in Spain in 1937 where 100 tanks were sent. In May - August 1939 these tanks took part in conflict at Khalhin-Gol as a parts of 6th and 11th Tank Brigade; in campaign in Western Ukraine; in Poland; in Winter War; and at the beginning of the Great Patriotic War. There were many vehicles developed upon BT-5 chassis: the bridgelayers, the amphibious tanks, the radiocontrolled tanks, the tanks with chemical weapons and so on.



The BT-5 light tank. 123rd Tank Brigade, Leningrad Front. November 1941.



The BT-5 light tank on the wheels.



Various turrets of the BT-5 tank: riveted (left) and welded.



The BT-5 tank column. Finland. January 1940.

REFERENCES:

[The profile of the BT-5 light tank](#)
[Specification of Soviet tanks](#)
[45mm Tank Gun Model 1932/38](#)

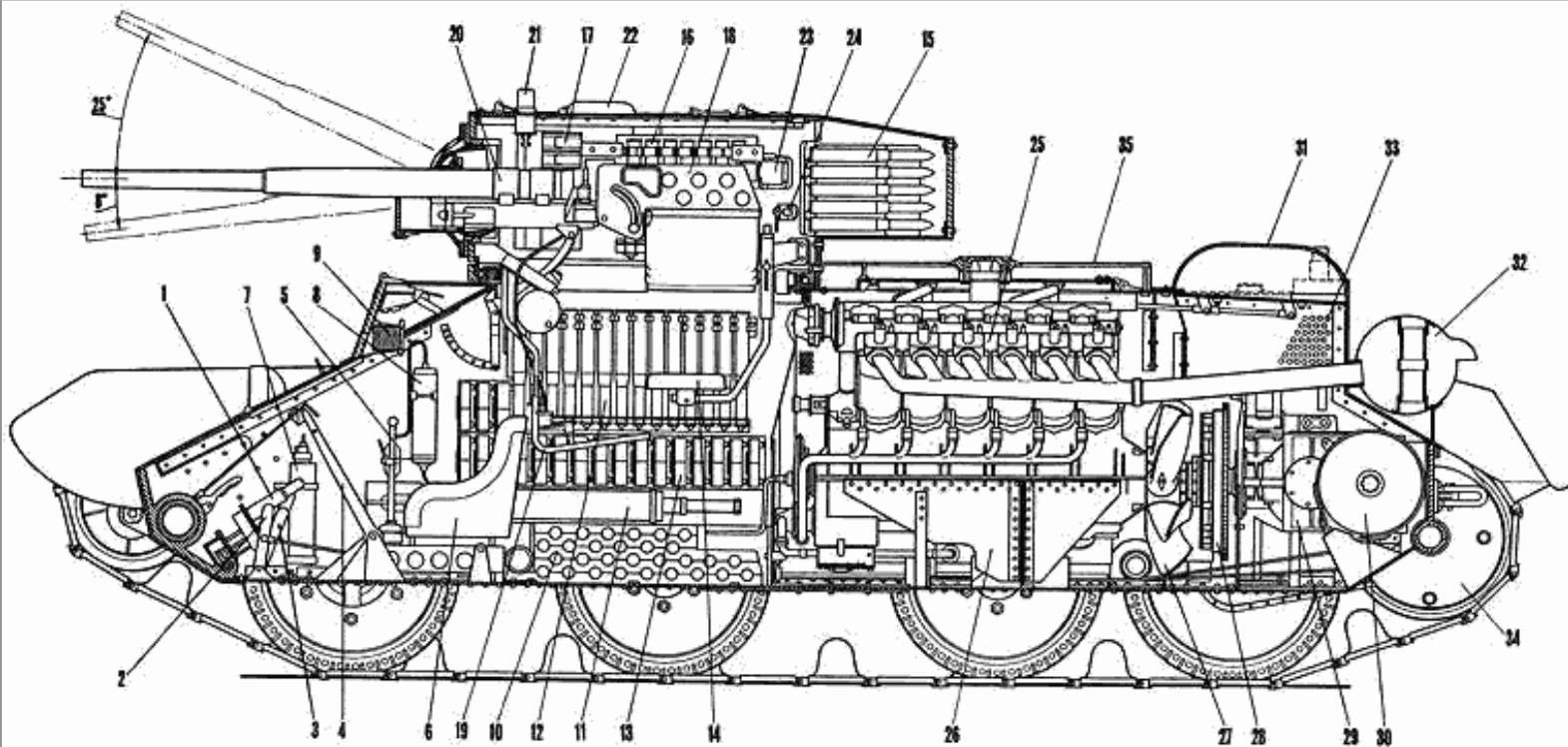
Sources:

"Bronekolleksiya" #1 1996
M.Baryatinsky, M.Kolomiets "BT-2 and BT-5 light tanks", 1996

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The Profile of the BT-5 Light Tank



Компоновка танка БТ-5 (продольный разрез):

1 — колонка рулевого механизма, 2 — педаль главного фрикциона, 3 — педаль тормоза, 4 — рычаги управления бортовыми фрикционами, 5 — рычаг переключения передач, 6 — сиденье водителя, 7 — огнетушитель съемный, 8 — огнетушитель стационарный, 9 — смотровой прибор водителя, 10 — укладка снарядов, 11 — рессора переднего колеса, 12 — укладка снарядов на стенке боевого отделения, 13 — укладка пулеметных магазинов на стенке боевого отделения, 14 — сиденье командира, 15 — укладка снарядов в нише башни, 16 — укладка снарядов на стенке башни, 17 — укладка

пулеметных магазинов на стенке башни, 18 — гильзоулавливатель с мешком, 19 — подножка с педалями и приводом для спуска, 20 — пушка, 21 — броневой стакан перископического прицела, 22 — колпак вентилятора, 23 — смотровой прибор башни, 24 — отверстие для стрельбы из револьвера, закрытое заслонкой, 25 — двигатель, 26 — подмоторная рама, 27 — вентилятор, 28 — главный фрикцион, 29 — коробка перемены передач, 30 — бортовой фрикцион, 31 — защитная сетка жалюзи, 32 — глушитель, 33 — отверстия во внутренней стенке корпуса для выпуска воздуха, 34 — картер бортовой передачи, 35 — щиток над радиатором.

Sources:

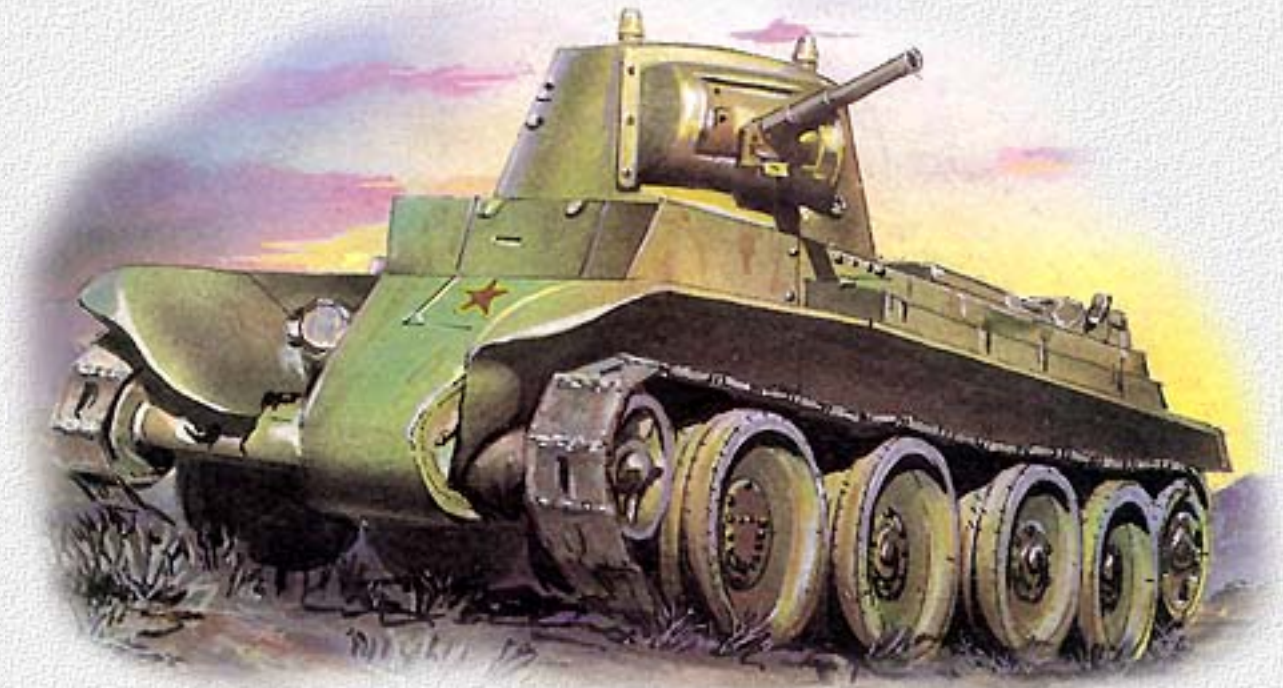
"Bronekolleksiya" #1 1996

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The BT-7 Light Tank

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Note: All Russian terms and abbreviations shown as *red italic* are described in the [Glossary](#).

Simultaneously with works over the further development [BT-5's](#) design (which was led by A.O.Firsov), in January 1933 *KhPZ* has been ordered to develop a new tank. It was supposed to improve some mistakes of the predecessors and equip it with a new M-17 engine - more reliable and powerful engine than the M-5, which was already used for [BT-2](#) and BT-5 tanks; completely welded tank hull; increased fuel capacity and new turret with a 76.2 mm gun. Thus, "the shock, long-range wheeled-tracked tank" was supposed to develop.



BT-7 light tanks on the Moscow military parade. November 7, 1938.

The new tank development was conducted by special engineers group including Bondarenko, Doroshenko, Kurasov, Veselovsky, Tarshinov and Morozov. In the beginning of 1934 the design drawings were handed in manufacture and the new tank model has received the BT-7 designation. The first tank was completed by 1st May 1934, the second - by 7th November. The first samples of the BT-7 tank had a coaxial machine-gun and the original turret (an elliptical form with an oblique roof). In future it was supposed to arm it with a 76.2 mm KT or PS-3 Main Gun.

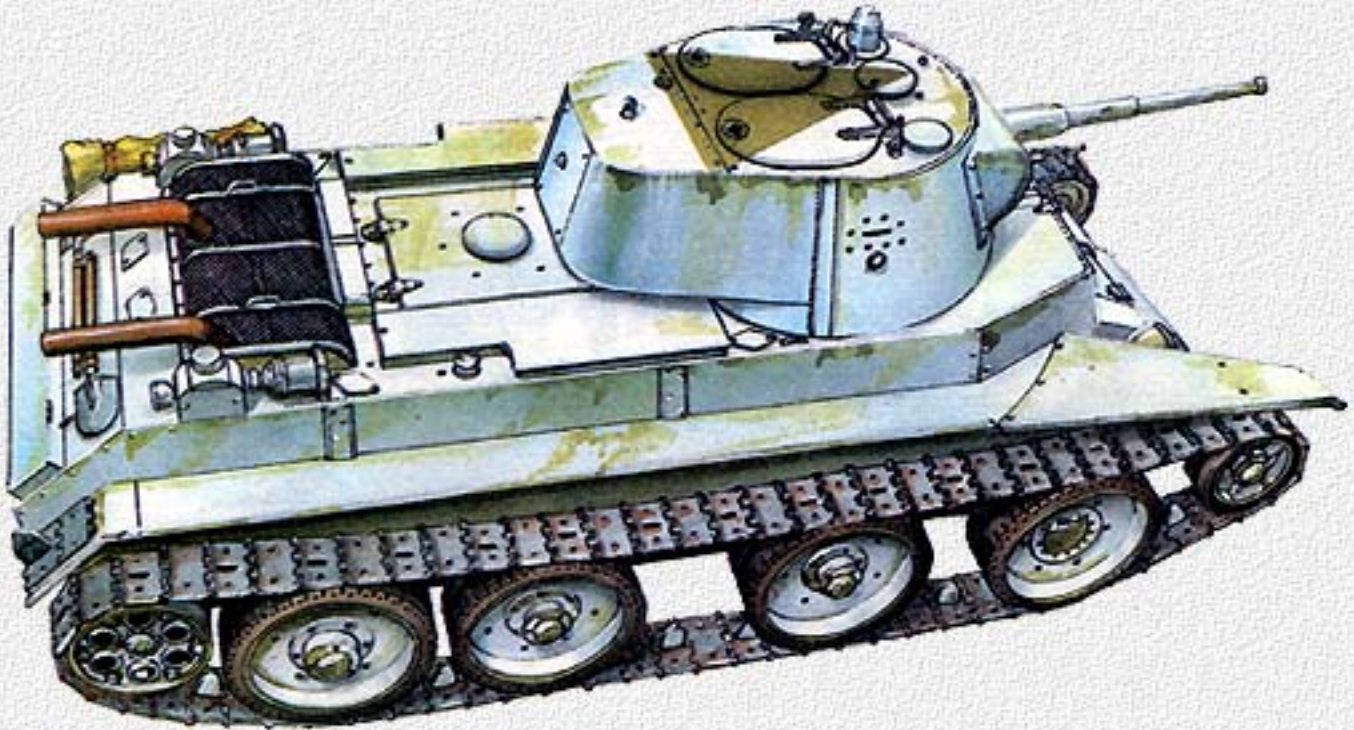
During the summer-autumn 1934, the first tanks have passed an extended program of tests. As a result the coaxial machine-gun was recognized as unnecessary, it was removed and the whole turret was slightly redesigned.



The BT-7 Light Tank of the 24th Tank Brigade. Lvov, 1939.

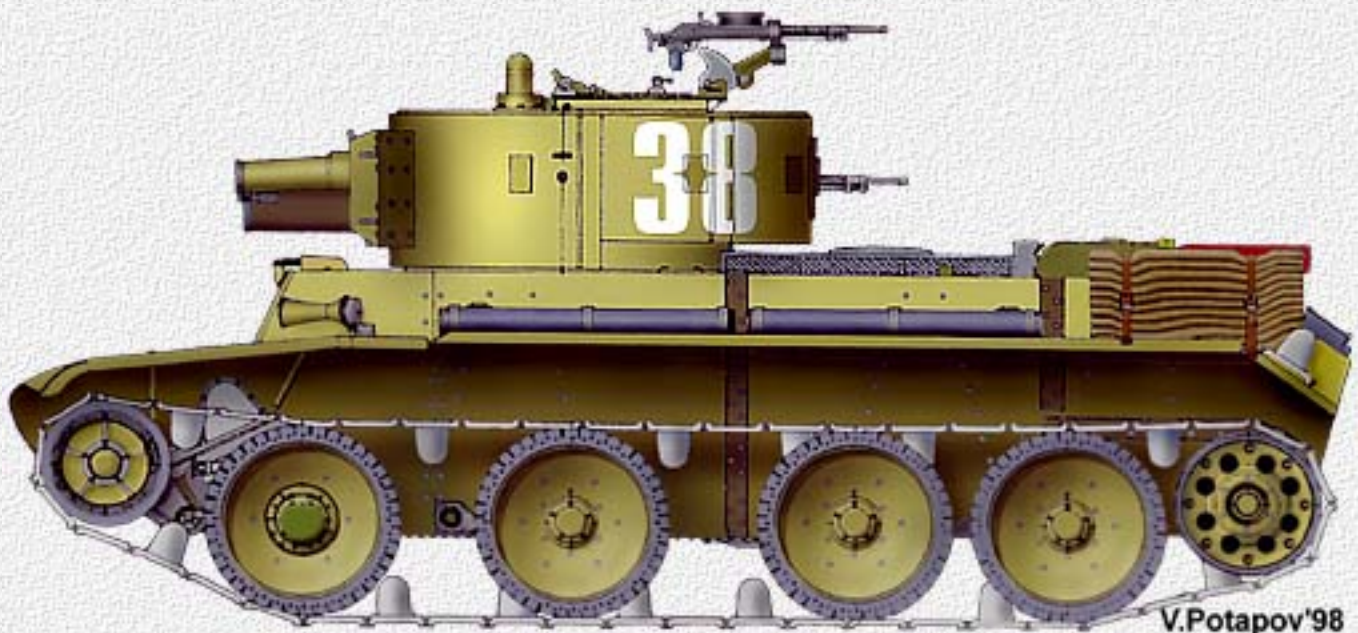
Therefore, at the beginning of 1935, the very first production BT-7 was very similar to its predecessor - BT-5. The dreams of the wheeled-tracked tank with a 76 mm gun weren't

abandoned however, and the **ABTU** had ordered the **KhPZ** to realize these ideas: to mount the turret from T-26-4 light tank on to BT-7's hull.



The BT-7M Light Tank. The 1st "Proletarskaya" (Proletarian) Motorised Division, Western Front. December 1941. The dark triangle at the roof of the turret used for better identifying for Soviet aircrafts.

The [45 mm 20K gun](#) and a DT machine-gun has been mounted in cylindrical turret. Some tanks (commanders tanks only) had the 71-TK radio instead of additional ammunition. The crew consisted of three men: a commander, a gunner and a driver.



The BT-7A Light Artillery Tank. (Pic. V.Potapov)



The BT-7A Light Tank.



The BT-7 light tank. Summer 1942.

Since 1937, the production of BT-7 with a conic turret begun. Tank armament was left unchanged, its ammunition was increased by additional 44 rounds though. For the effective night shooting a two special headlights have been placed on the gun's mantlet. Subsequently all earlier produced tanks were equipped with such headlights. The 4-speed gearbox was replaced with more modern 3-speed. The tank's chassis was improved as well.

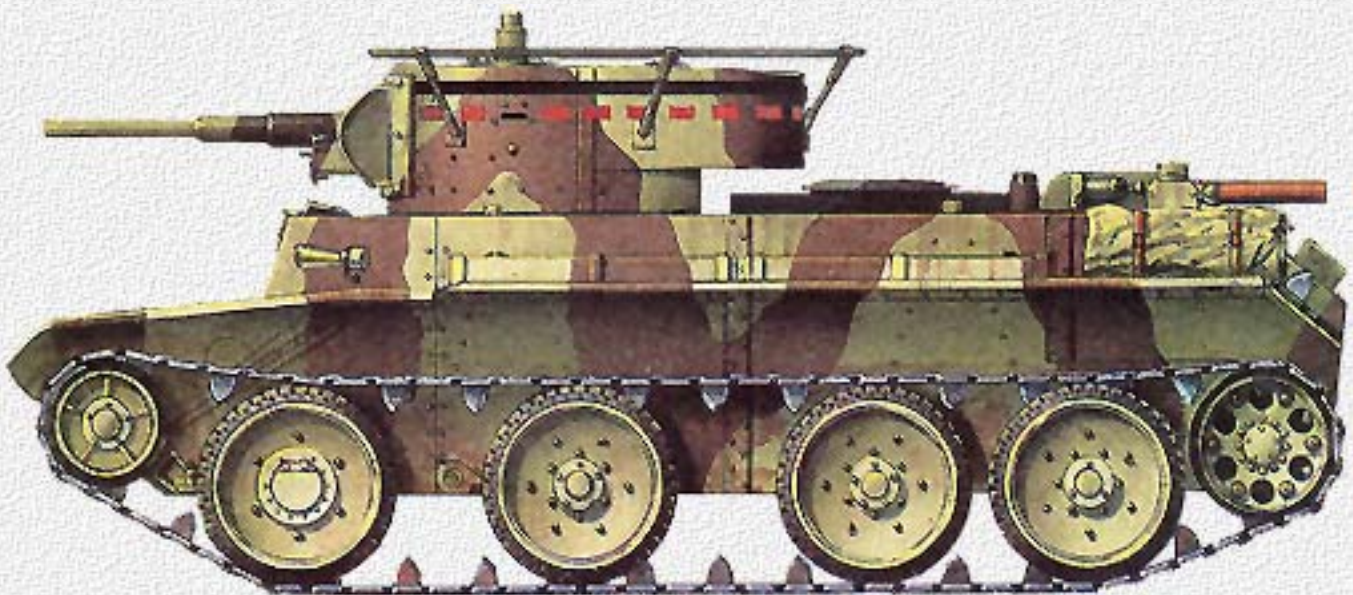
At the same time, the 154 pieces of BT-7A tank have been manufactured. The "A" letter means "artillery" and it's factory index was A-7M or A-8. That version had larger turret with the short barreled 76.2 mm KT gun installed in it. Gun was equipped with 50 rounds (tanks with a radio had 40 rounds). Some documents claims there were ideas to rearm it with the 76.2 mm long barreled L-

10 gun on the BT-7A tanks. That claims seems to me incorrect because the L-10 was produced in a very limited number and that number was insufficient ever to rearm the [T-28](#) medium tanks, so it was impossible to rearm BT's. In 1938 four newest BT-8 tanks with a diesel engine V-2 have been built in KhPZ. After the comparative tests (in 1940) of BT-7 and BT-8 production of a diesel tanks were begun. This powerful engine V-2 was designed for [T-34-76](#) medium tank as well as for "Voroshilovetz" artillery tractor. To increase the production rate of the V-2 engines it's manufacture was allocated in an independent Factory #75.

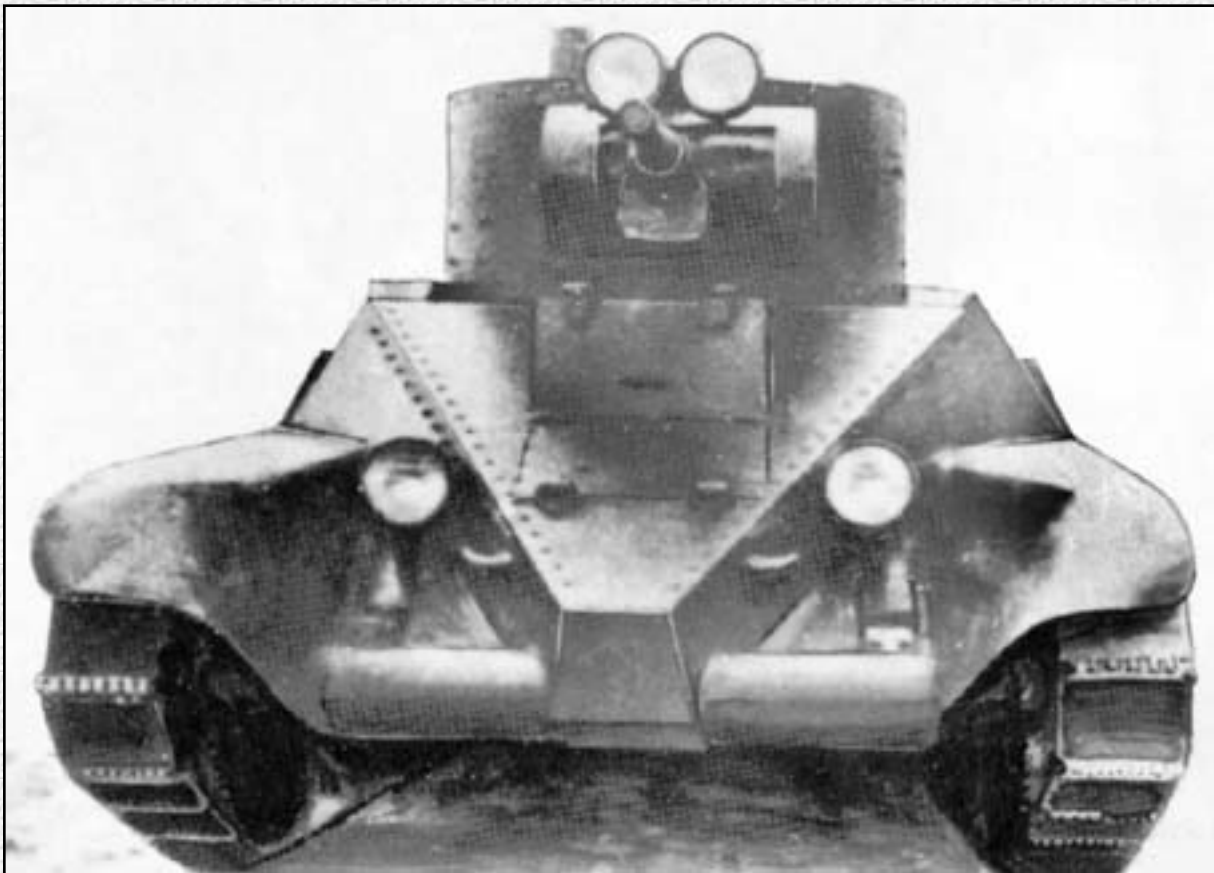
The last attempt to modernise the BT-7 (increasing its armor protection) was undertaken just before the war. In 1940 the Mariupol factory has made a 50 sets of the additional homogeneous armor for BT-7M. From 1935 to 1940 the 5328 BT-7 tanks were built (exclude the BT-7A). They served in Red Army during the whole war. In 1945 these tanks were used last time in battles against Japan Army in Mongolia and China.

Several experimental tanks were based on the BT-7:

- The BT-IS - a tank with improved chassis. Never served in the Red Army.
- The BT-SV-2 - a tank (also called as "Cherepakha") with improved hull's and turret's form. Never served in the Red Army.
- The KBT-7 - a commander tank. The "K" letter means "Komandirsky" - commander. On this tank the standard turret was replaced with a new non-revolving turret. Never served in the Red Army.
- The OT-7 - a flamethrower tank. Never served in the Red Army.
- The HBT-7 - a chemical tank (armed with chemical weapons). The "H" letter means "Himicheskiy" - chemical. Never served in the Red Army.
- The SBT - a bridgelaying tank. Never served in the Red Army.
- The TTBT-7 - a radio-controlled tank. Never served in the Red Army.
- The TUBT-7 - a radio-controlled tank. Never served in the Red Army.



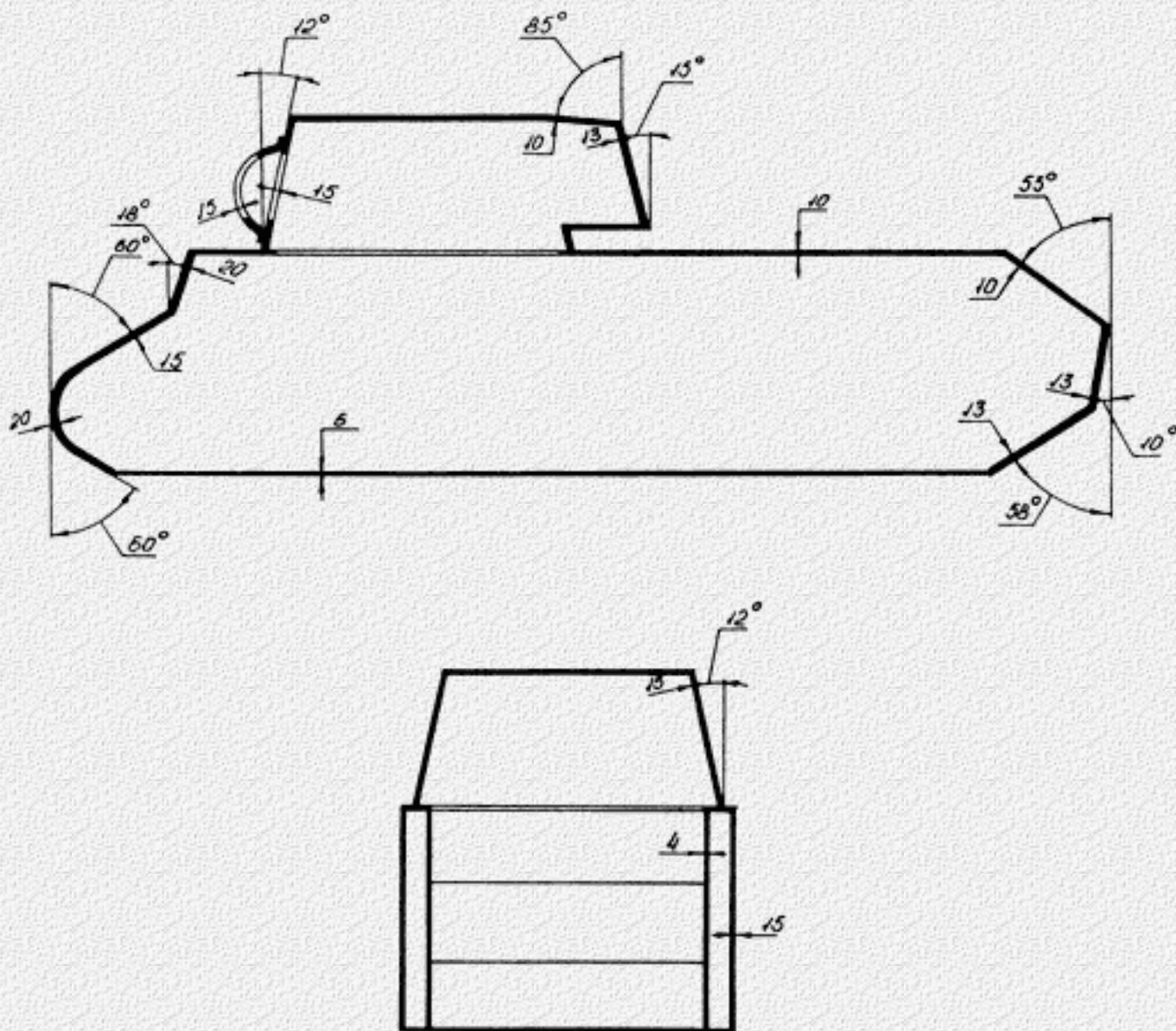
The BT-7 Light Tank with radio antenna fitted around the turret. Summer 1936.



The BT-IS Light Tank



The BT-SV-2 "Cherepakha" light tank



REFERENCES:

[The profile of the BT-7 light tank](#)

[Specification of Soviet tanks](#)

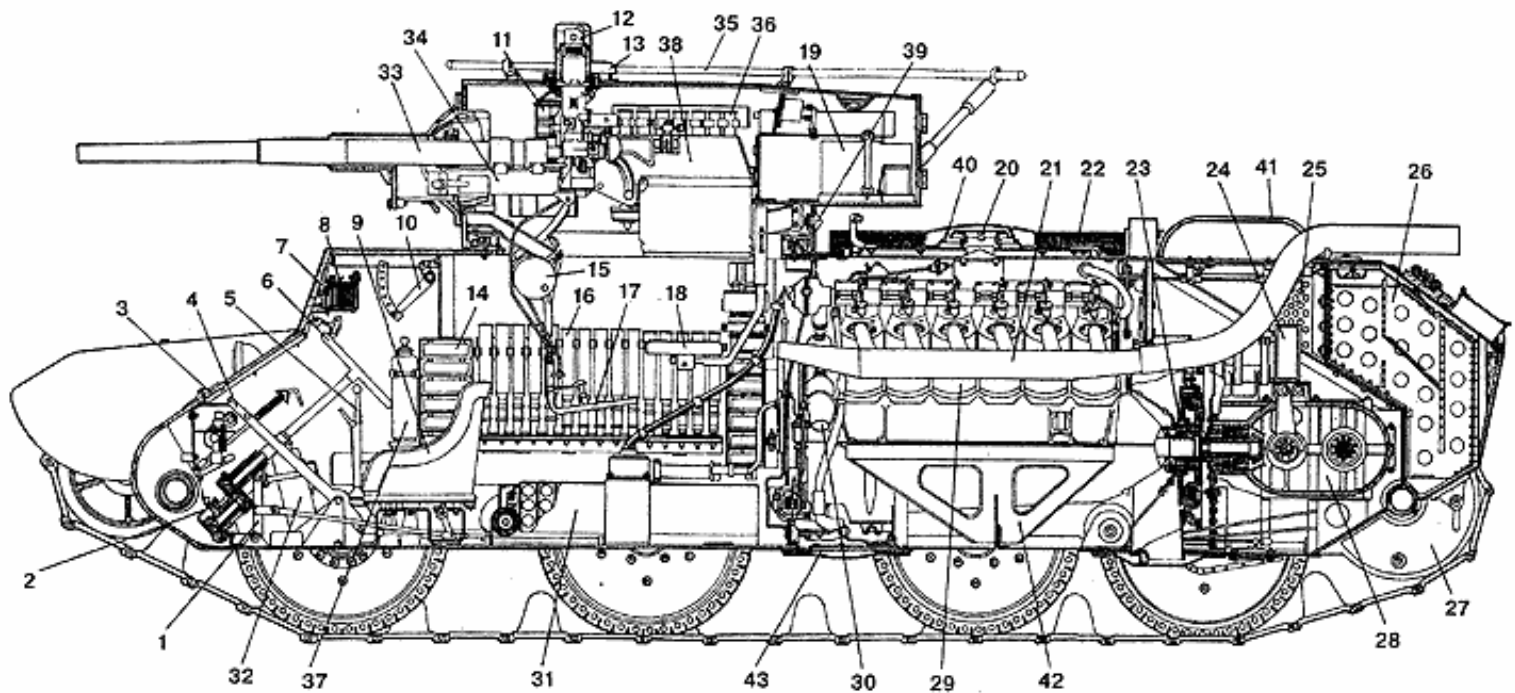
[45mm Tank Gun Model 1932/38](#)

Sources:
"Bronekolleksiya" #5 1996
Cover picture - V.Lobachev

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The Profile of the BT-7 Light Tank



Компоновка танка БТ-7:

1 — педаль главного фрикциона, 2 — колонка рулевого механизма, 3 — нижняя дверка люка механика-водителя, 4 — рычаги управления бортовыми фрикционами и тормозами, 5 — рычаг кулисного механизма переключения скоростей, 6 — рулевое колесо, 7 — верхняя дверка люка механика-водителя, 8 — смотровой прибор механика-водителя, 9 — сиденье механика-водителя, 10 — рукоятки для открывания и закрывания жалюзи, 11 — укладка пулеметных дисков на стенке башни, 12 — перископический прицел, 13 — козлак

вентилятора, 14 — укладка пулеметных дисков на стенке корпуса, 15 — подъемный механизм пушки, 16 — укладка снарядов на стенке корпуса, 17 — подножка с педалями и приводом для производства выстрела, 18 — сиденье наводчика, 19 — радиостанция, 20 — козлак над всасывающей трубой, 21 — главный фрикцион, 22 — щиток над радиатором, 23 — главный фрикцион, 24 — стартер, 25 — отверстие для выхода воздуха при закрытых жалюзи, 26 — кормовой бензобак, 27 — картер бортовой пе-

редачи, 28 — коробка передач, 29 — двигатель, 30 — магнето, 31 — укладка снарядов на полу боевого отделения, 32 — ручной огнетушитель, 33 — тело пушки, 34 — люлька пушки, 35 — поручневая антенна, 36 — укладка снарядов на стенке башни, 37 — стационарный огнетушитель, 38 — гильзоулавливатель с мешком, 39 — заглушка отверстия для стрельбы из револьвера, 40 — пылеуловитель, 41 — защитная сетка жалюзи, 42 — подмоторная рама, 43 — крышка люка под двигателем.

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The T-26 Light Tank

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The T-26 Light Tank Model 1933.

Development History.



The twin-turret T-26 Model 1931.



The column of the T-26 Light Tanks Model 1931.

The first tank of this class was the T-18 (also known as the MS-1) that was developed and produced in 20th. Later, the T-19 and T-20 were intended to replace the T-18, but they were delayed because of trouble with their engines. Thus, those projects were stopped and instead of that, the British light tank "Vickers E" was produced under license (that doesn't mean it was a mass production, rather an attempt to develop a new tank on a "Vickers" base).

On 28 May 1929, an agreement with the Vickers corporation was signed and the first party of 15 tanks was delivered to the Soviet Union. Those tanks were named V-26. Their design became a basis for the further Soviet tank modernisation: the TMM-1 and TMM-2. Extensive comparative tests of the B-26, T-19, T-20, TMM-1 and TMM-2 were carried out on the Kubinka proving ground.

The T-20 showed the best result, however it was equipped with an

experimental engine, that wasn't in a mass production. So, on February 13 of 1931 the RVS signed an order to accept for Red Army service the "Vickers E" light tank under the new designation of T-26 and recommended to start its mass production.

The STZ was ordered to start manufacture these tanks (with a 13,800 vehicles of yearly output!). However this industrial plant was still under construction, thus another factory (the "Bolshevik" factory in Leningrad) received the same order. Later, "Bolshevik" was split into two independent factories - "Bolshevik" and #174 "K.E.Voroshilov" which continued to produce the T-26 tanks. Over 10 years this factory produced more than 12,000 tanks of that type. The last tanks were produced at the beginning 1941.

The first production T-26 tanks had two turrets and were similar to the original "Vickers."

The first party of T-26's served in the Red Army from September 1931 and took part in a military parade on Red Square in November 7. The T-26 became prevalent tank in the Soviet tank forces. Many further projects were based on this tank.

However, Soviet tankers strongly disliked this tank. Although it was produced in large numbers, it had still many defects. For example, it had a thin armor and a weak engine. During 1931-1941, 23 modifications were made in attempts to improve its engine. However, engine power was increased from only 90 h.p. to 97 h.p. That was obviously insufficient.

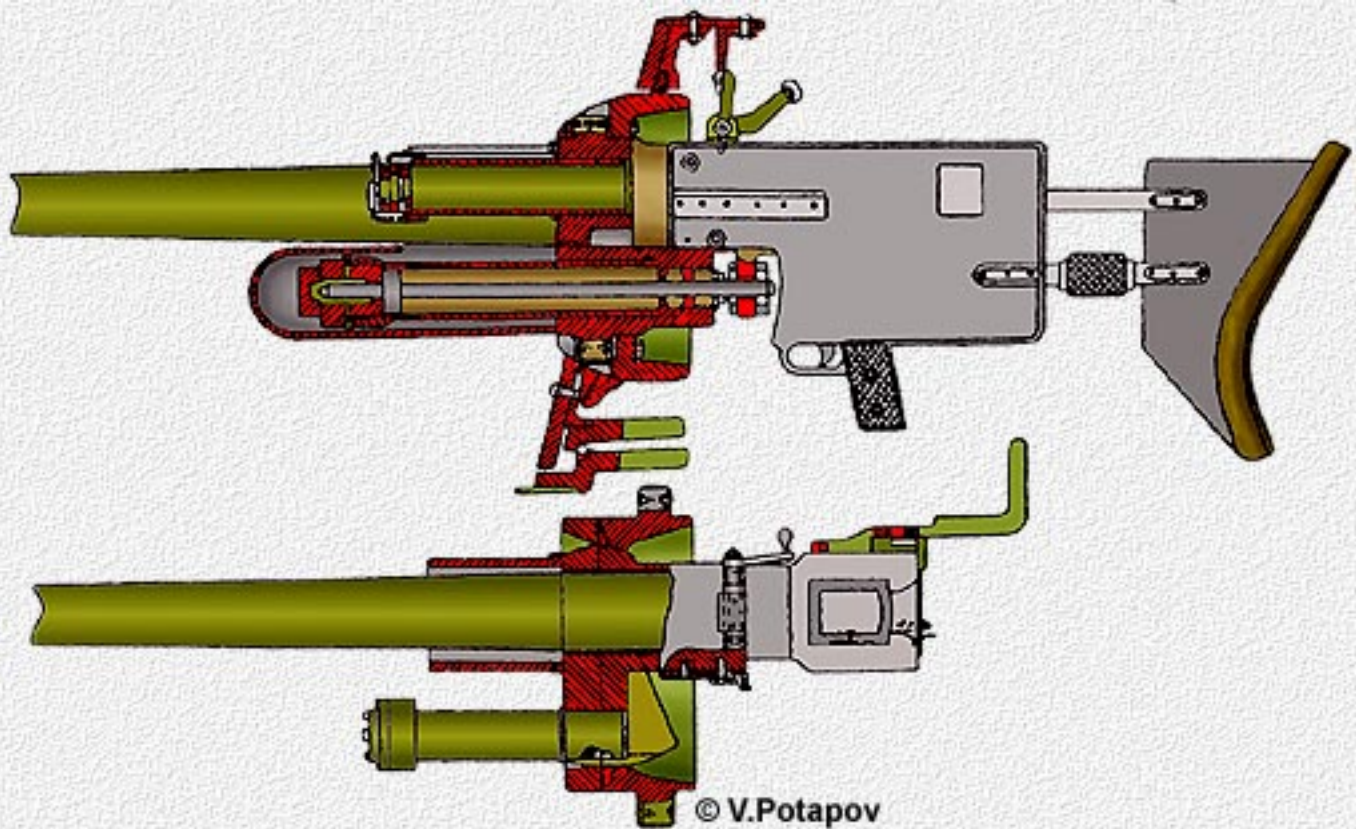
Main Battle Tanks

During the first two years (1931-1932) the only twin-turret model of T-26 was producing. Later, when various modifications appeared, the Red Army designated them as "T-26 model 1931-32", "T-26 model 1933-37" and "T-26 model 1938-39". The T-26A, T-26B, T-26C etc. designations were used by the Germans during the WWII and completely unknown in the USSR (I think we should use the original designations - **Valera**). Each turret of the twin-turret version was armed with one machine-gun and could rotate on 270°.

The T-26 armament consisted of (depending on version):

- two DT machine-guns;
- the 37 mm gun and the DT TMG;
- the 45 mm gun and the DT TMG.

Tanks armed with a gun were used as commander's tanks; that's why some of them were equipped with radio. The 37 mm gun was originally a Hochkiss gun, modified in the USSR. Later, it was replaced with the Soviet 37 mm PS-2 gun model 1930 (Designer - P.N.Syachentov.) That was a fully redesigned Rheinmetall 37 mm AT-gun Pak 30 with a longer barrel and higher muzzle velocity. Tanks armed with those guns were known as the T-26 Model 1932.



The Soviet variant of the Hochkiss 37 mm Tank Gun. *(V.Potapov)*

Production of the T-26 with a single turret (the same turret as on [BT-5](#)) has started in 1933. That model was equipped with the a 45 mm gun 20K model 1932/38 as well as a DT TMG. That was the most numerous modification of T-26, over 5,000 tanks were built. During the production many changes were made: capacity of the fuel tanks was increased, tank received an antiaircraft machine-gun. After 1937, all tanks started to equip with a 71-TK-3 radio. A powerful searchlight was installed on the gun for a night combat. Different versions of the T-26 carried a various amounts of ammunition.



The T-26 Model 1933. *(A.Sheps)*

In 1938, the new T-26 version with the new welded conic turret was developed. The tank was armed with the newest 45 mm gun 20K model 1932/38, advanced gunnery optics and had an increased capacity of the fuel tanks.

The next modification - the T-26 model 1939 - was developed in 1939. That model had a sloped armor and improved engine ventilators that were protected against the "Molotov cocktails" (derived from the combat experience in Spain Civil war). After adding of those modifications, the tank weight increased. Up to end 1939, more than 1,300 tanks were produced.

The T-26 in Action

Even before the World War Two, the T-26 tank took part in many military conflicts. The conflicts in Finland, and Poland are considered part of WWII - at least outside of Russia. In July 1938, the military conflict between Soviet and Japanese forces began at Hasan Lake and again, T-26's were used.

From the Soviet side there were:



A destroyed T-26 Model 1933 light tank.

A.P.Panfilov's 2nd Independent Mechanized Brigade (three battalions of T-26, a battalion and a company of "BT" tanks and a company of experimental SU-5 SP guns), which was attached to the 39th Rifle Corps, the 32nd (of major M.V.Alymov) and 40th (commander - 1st lieutenant Sitnikov) Independent Tank Regiments.

In total, 351 tanks were used in those battles: 257 T-26's, 81 BT tanks and 13 SU-5's.

Soviet losses were: 9 destroyed and 76 damaged T-26's, plus a 8 BT tanks destroyed. 39 tanks were repaired soon, another 40 tanks were sent back to the factories due to their heavy damages. Many tanks were damaged because of technical difficulties: gearbox or friction clutch failures.



**T-26 Model 1939 and its crew before battle.
July 1941.**

In August 1939, Soviet tank forces had over 8,500 T-26 tanks. At the beginning of the Great Patriotic War, they were the most common tanks in the Red Army. Over 12,000 tanks were produced. It was intended as an "infantry" tank, i.e. for close support during an infantry attack. Each Soviet rifle (infantry) division had one company of those tanks.

Experimental Tanks Based on the T-26.

In 1933, a new project of the infantry tank was finished. The tank was based on the T-26 tank and named "P-T-26". However the project was abandoned, but the next project - artillery tank "T-26A" or "T-26-4" - was finished and even produced in limited numbers. It

had the same turret as on the [BT-7A](#) tank and a 76.2 mm KT-26 gun. Tank was intended for direct artillery support of tank attacks. In 1934-1935, 65 tanks were manufactured and after that, production was canceled.

T-26PT - twin turret command tank, 1931-1933. Was equipped with 71-TK-1 wireless, 96 tanks were produced.

OT-26 (HT-26) - flame-thrower (chemical) tank 1933-1934. Armament: flame-thrower and one machine-gun. A few tanks were produced.

T-26PT - single turret command tank, 1933-1940 equipped with 71-TK-3 wireless. Armament: 45 mm 20K gun model 1932/38, 2 machine-guns. Total 3938 tanks were produced.

T-26A (T-26-4) - artillery tank, 1933. Armament: 76.2 mm KT-28 gun, 2 machine-guns. A few tanks were produced.

ST-26 - a bridgelayer tank, 1933-1935. Armament: one machine-gun. 65 tanks were built.

TT-26 - a radio control (telemecanic in Russian terms) flame-thrower tank, 1935-1936. Armament: flamethrower, one machine-gun. 55 tanks were built. Used together with the TY-26 tank only.

TY-26 - a radio control (telemecanic in Russian terms) command tank, 1935-1936. Armament: 45 mm 20K gun, one machine-gun. 55 tanks were built. Used together with the TT-26 tank only.

OT-130 - a flame-thrower tank, 1938. Armament: flame-thrower, one machine-gun.

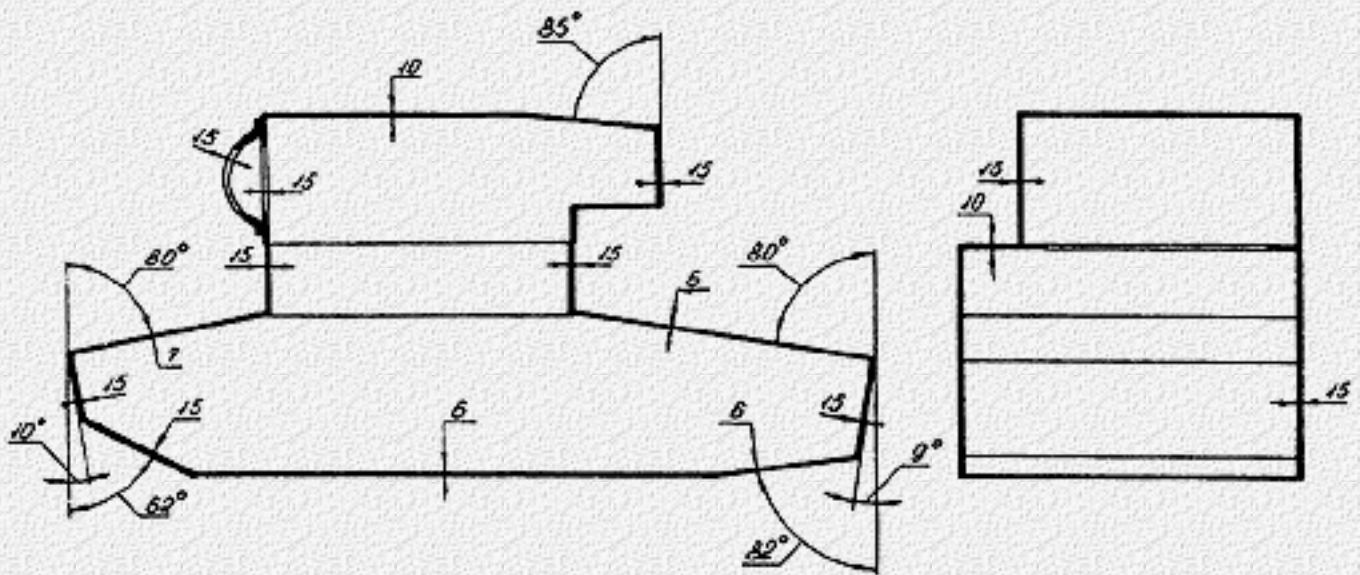
OT-131 - a flame-thrower tank, 1938. Armament: flame-thrower, one machine-gun. A few tanks were produced.

OT-132 - a flame-thrower tank, 1938. Armament: flame-thrower, one machine-gun. A few tanks were produced.

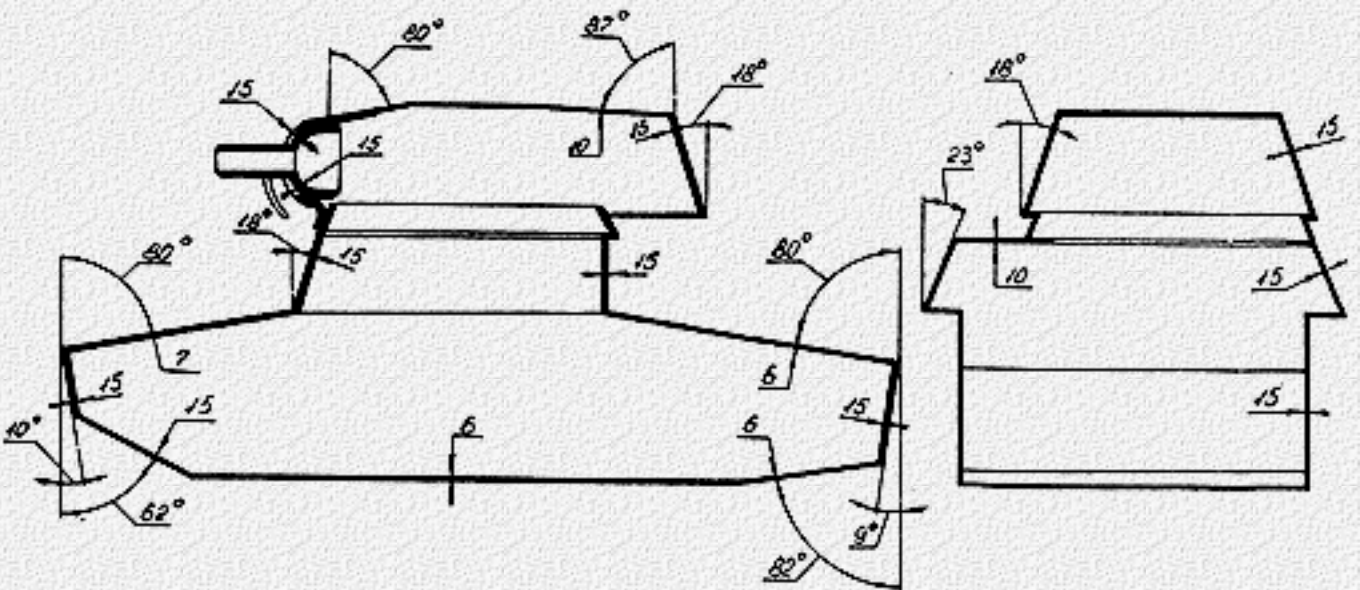
OT-133 - a flame-thrower tank 1939. Armament: flame-thrower, 2 machine-guns.

OT-134 - a flame-thrower tank 1940. Armament: 45 mm 20K gun, flame-thrower, 2 machine-guns. 1336 tanks were produced.

Armor Protection of the T-26 Light Tank Model 1933



Armor Protection of the T-26 Light Tank Model 1939



REFERENCES:

Blueprints of the T-26: [sheet 1](#) and [sheet 2](#)

[The profile of the T-26 light tank](#)

[Specification of Soviet tanks](#)

[Specifications of Soviet tank guns](#)

Sources:

M.Baryatinsky "Soviet tanks in World War Two" 1995

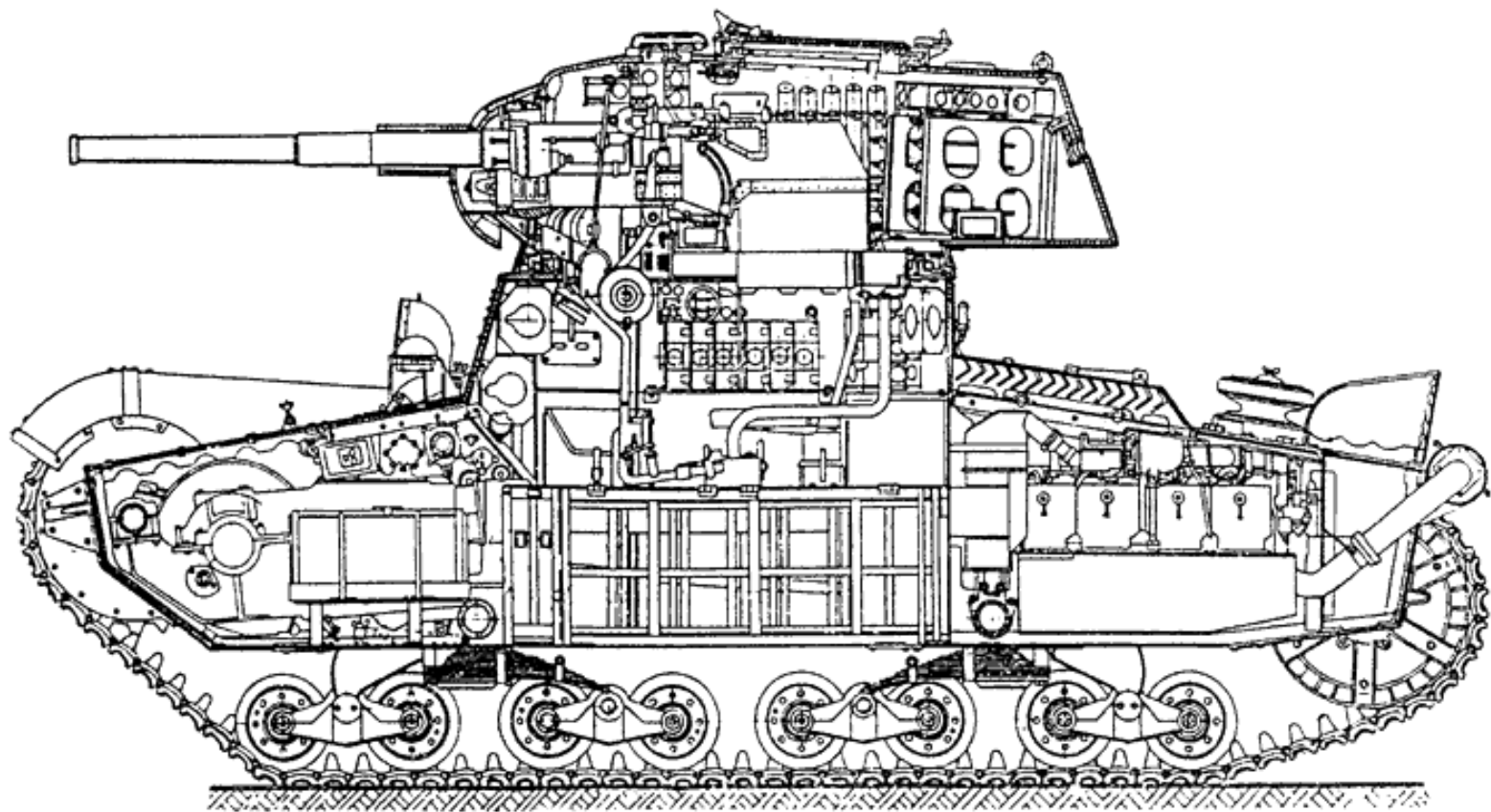
"Light tanks of the Red Army 1931-1939" 1997

Cover picture - A.Zhirnov

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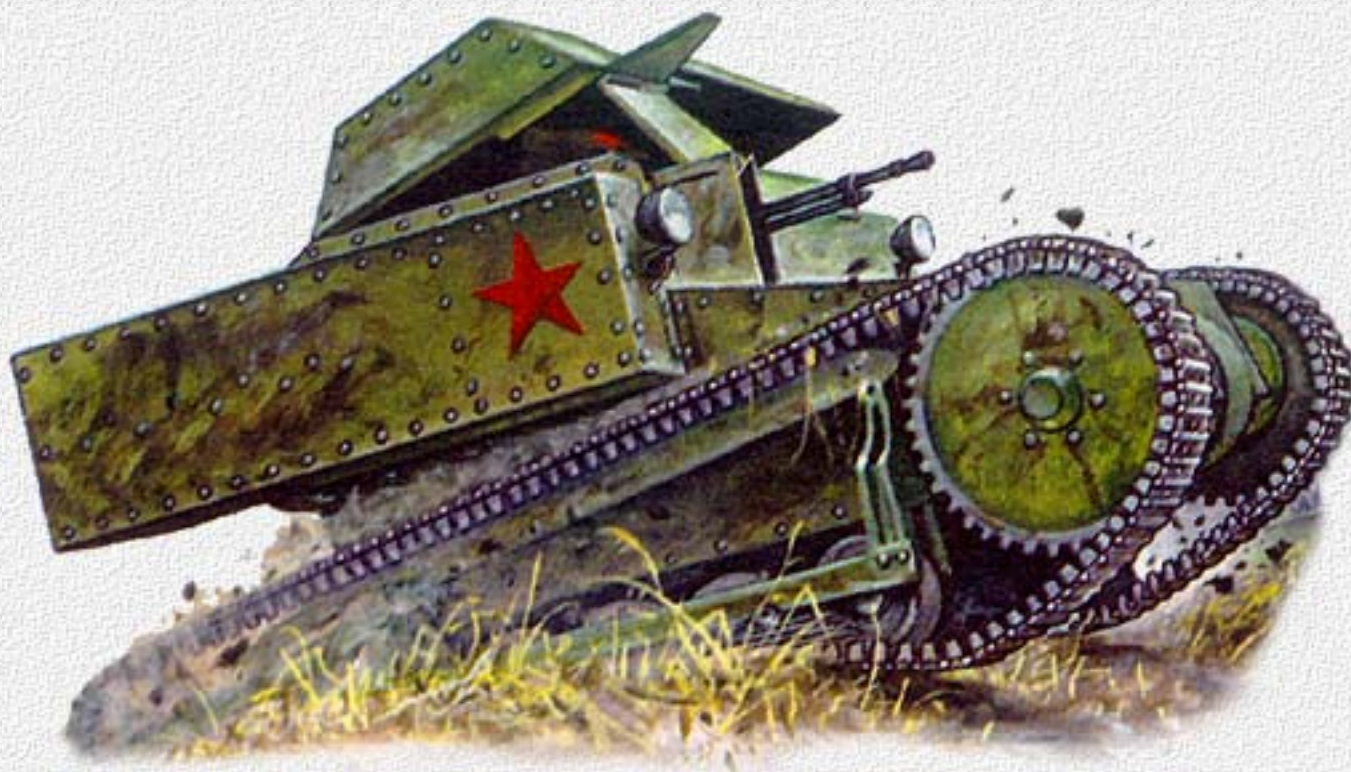
The Profile of the T-26 Light Tank



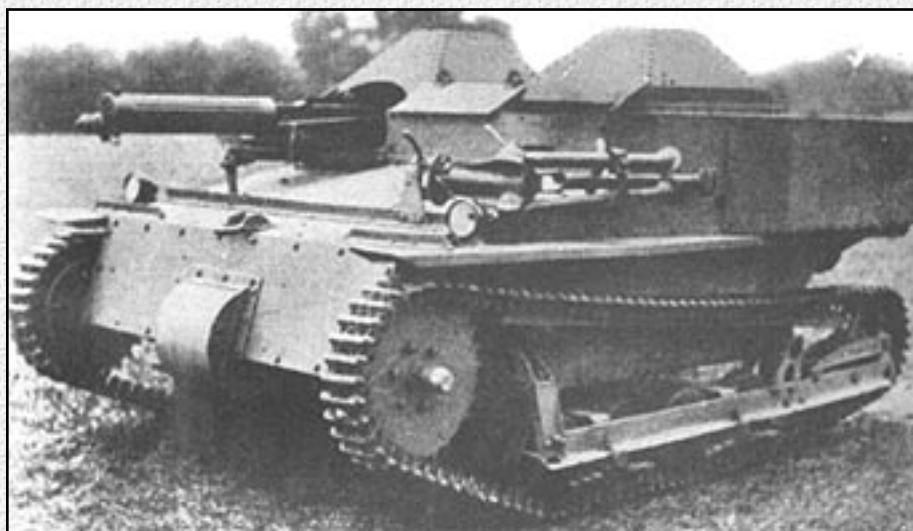
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The T-27 Armored Tankette

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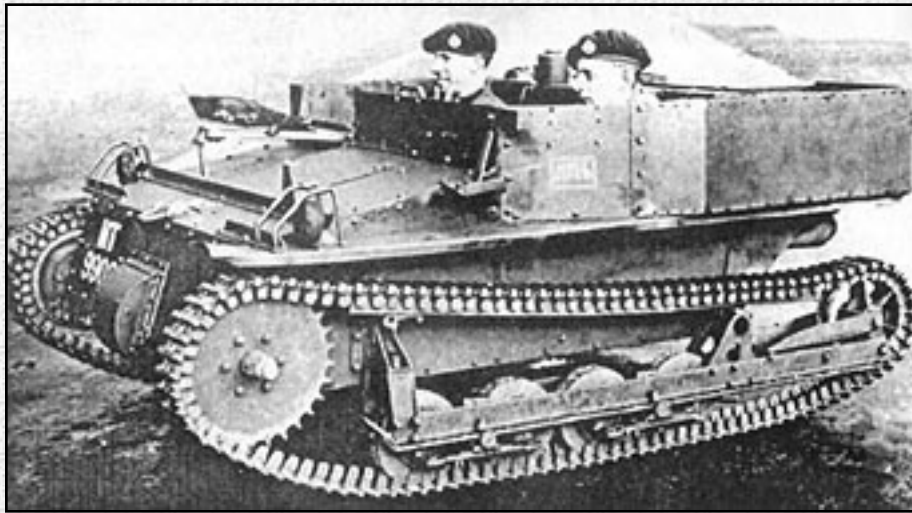
During World War One, there was already a need for fast and maneuverable tanks to exploit the success of the infantry and to support cavalry to enter the rear of the enemy. The first light tanks were the French Renault FT-17 and the British Mk A. There was also a need for small super-light tanks for reconnaissance: the tankette.



**The original British Mk.IV Carden-Loyd
armed with the 7.92-mm Vickers.**

One of the first tankettes was developed by Englishman Major J. Martel. In his own repair shop, he constructed his tankette from spare parts and elements of common cars. It was a single-seat vehicle with very light armor protection, and was armed with one machine-gun. In trials, the tankette achieved a speed of 24 km/h.

Almost simultaneously, a small single-seat tankette was



The Mk.IV Carden-Loyd.

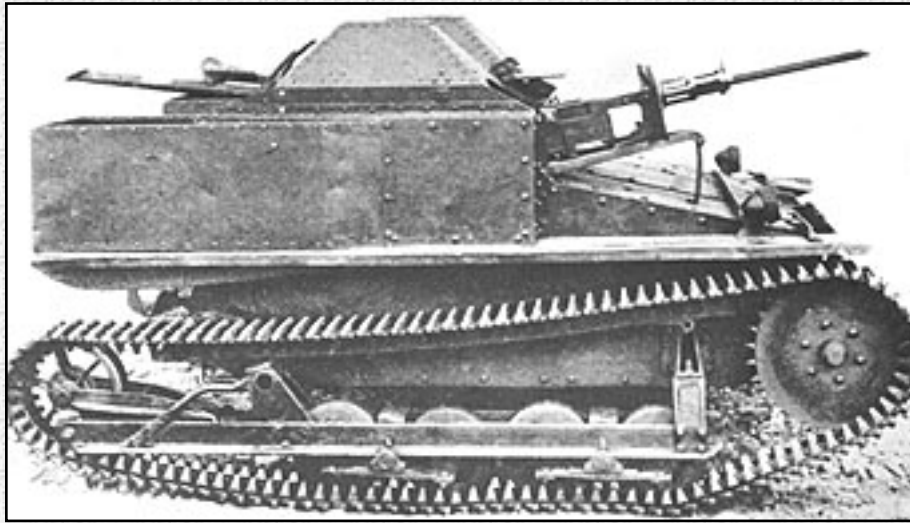
developed by another Englishman, engineer J. Carden, in which the driver was in a prone position. The first tankettes were full of various defects and imperfections and none of them were put into mass production.

Taking into account the defects of the first tankettes, engineers started working on two-seater vehicles, which were ready by 1927. The two-seater variant was

chosen because engineers doubted that one person would be able to act as driver, machine-gunner, and observer simultaneously.

The most successful tankette was a two-seater that went through numerous modifications and improvements and was finally accepted for service in 1929 under the "Mk IV Carden-Loyd" designation. It was manufactured by Vickers-Armstrong. The tankette was quite popular, and it was sold to sixteen countries all over the world, including Poland, Italy, Czechoslovakia, France, Japan, Canada, Belgium and Egypt.

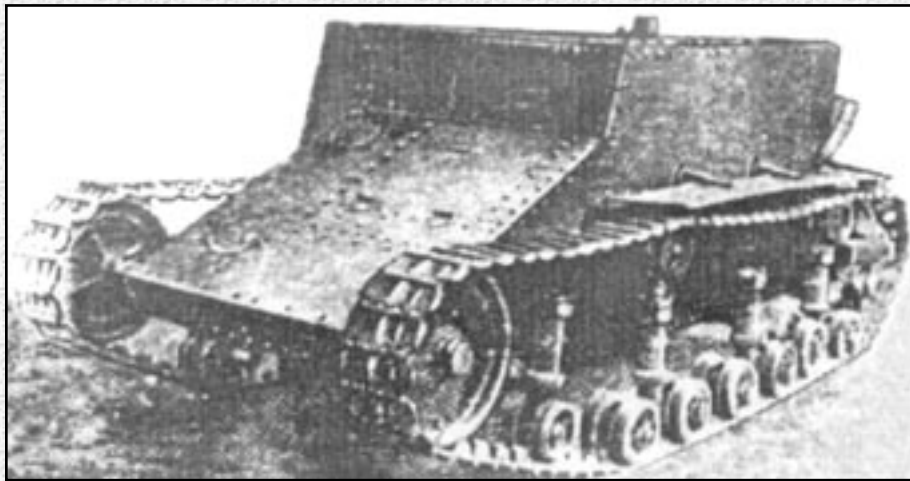
By the mid 1920's, France paid little attention to the development of light tankettes. However, the obvious success of the English attracted their attention and compelled French engineers to start their own work on tankettes. In 1929, they developed the single-seated tankette called the "Sabat." This vehicle was intended to be transported by a truck, and in battle it ran on its tracks. The tankette was operated by a driver who was in the prone position. During a non-combat situation, the driver could operate the tankette in a sitting posture. France received a license to manufacture the Carden-Loyd, and this defined the future development of French tankettes. For example, in 1933, the "supply tank" Renault UE was developed, and later it was converted to a common tankette.



The Italian C.V.29 (former Carden-Loyd) armed with the 6.5-mm Fiat Mod.14 machine-gun.

Italy received a license for the Mk IV as well, and then manufactured it under the designation C.V.29 where the "29" stood for the year it was accepted for service. These vehicles were used quite intensively during the Spanish Civil War. Poland developed its own reconnaissance tank TK-3 (1931) and then the TKS (1934) which were copied from the original Carden-Loyd. The Czech developed and manufactured the MU-4 tankette.

In Russia, the very first tankette project was independently developed in 1919 by the Russian engineer I. Maksimov. The tankette was named "Sh'itonoska" which meant "Shield Carrier." The vehicle was armed with one machine-gun and was operated by a single crewman who was in the prone position.

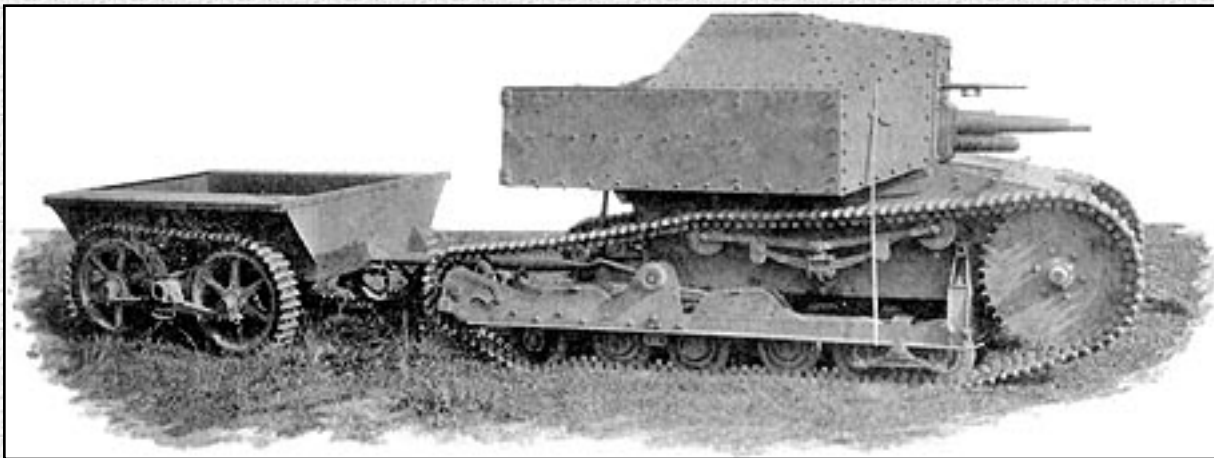


The T-23 experimental tankette.

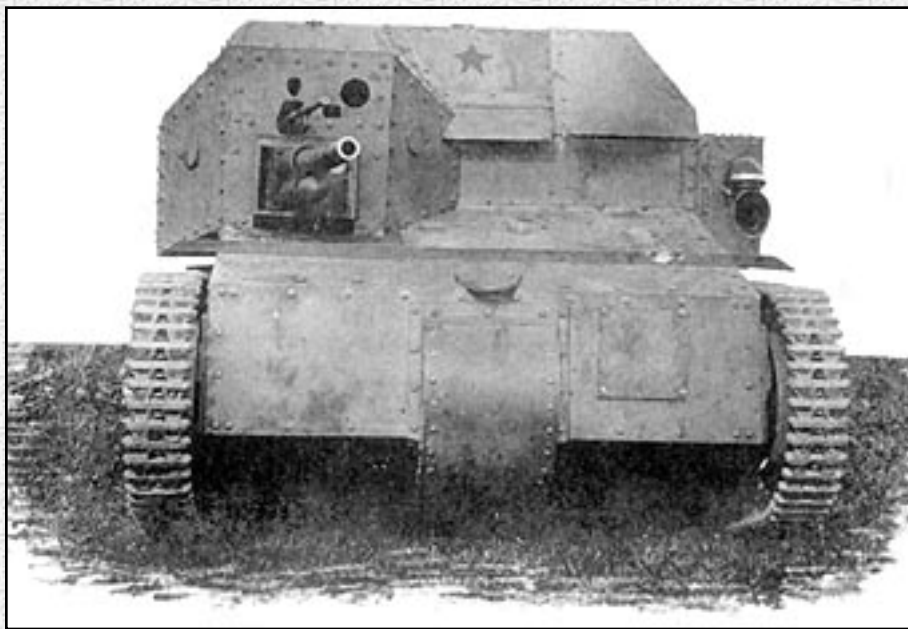
By the end of the 1920's, new rules and regulations for the Red Army were introduced. The regulations defined the future development of the domestic armored fighting vehicles, and in particular they stipulated the "development and manufacture of a small reconnaissance tank" that was intended for co-operation with the MS-1 tanks as well as for reconnaissance and for

communication purposes.

In the period of 1927 to 1930, the Design Bureau of the VOA ("Vsesouznoe Orudijno-Arsenal'noe Ob'edinenie" - "All-Union Arsenal Association") designed several tankettes based on the chassis of the T-16 light tank: the T-17, the T-21 (only a paper project), the T-23, and the T-25 (paper project). The T-23 was designed in two variants: one with a turret, and the other turretless. The T-25 was a modernized variant of the T-17 tankette.



The K.Sirken's SP Gun based on the T-27. This variant armed with the 37-mm Hochkiss and the DT TMG. 1931 (RGAKFD)

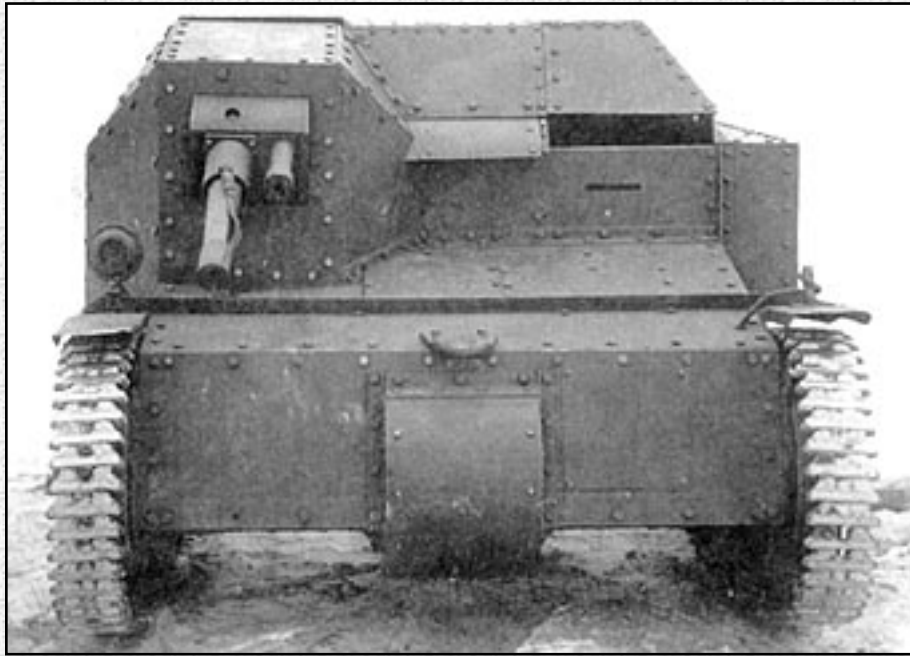


**The front view of the K.Sirken's SP Gun.
1931 (RGAKFD)**

All of these vehicles were quite good for the time, although they had many flaws. These defects would have taken a lot of time to correct, and because of this, the idea came up to buy a license for the Carden-Loyd Mk IV. In 1930, the Soviet Union bought the first batch of 26 original Carden-Loyd tankettes from Britain. In the Soviet Union, these vehicles were re-named the 25-V (some archive documents name them the K-25). Also, the Soviet Union bought a license to mass produce these

vehicles.

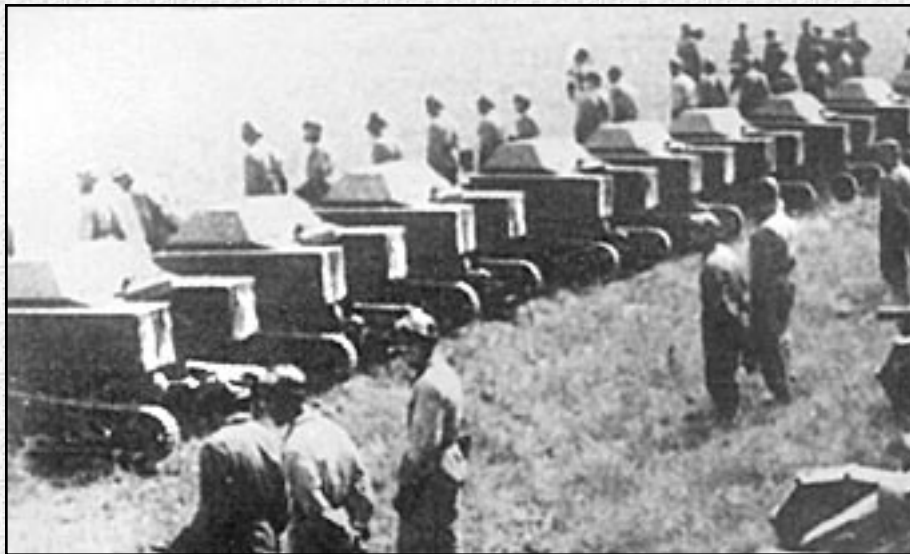
According to the production plan, in 1930 to 1931, 290 tankettes had to be manufactured, and after that 400 tankettes per year. The manufacture was set up in the Autozavod #2 VATO in Moscow (in 1932, this factory was renamed to Factory #37).



**Another variant of the K.Sirken's SP Gun.
1931** (RGAKFD)

However, Soviet engineers weren't fully satisfied with the original Carden-Loyd tankette and before its mass production they significantly modernised it (the Chief Engineer was N. Kozyrev, and the Lead Engineer was K. Sirken). The hull's dimensions were increased, the running gear was improved, and the machine-gun mount was modified for the installation of a DT machine-gun. Some other improvements were made to take into account the USSR's geographic and climatic conditions and the Russian

mindset.

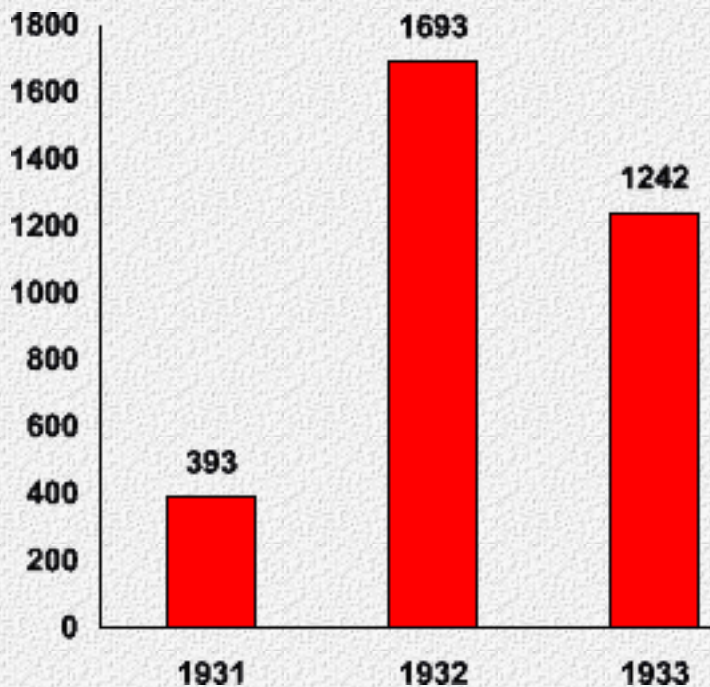


**T-27 in order of the Kalinovsky Brigade.
Summer 1933.** (RGAKFD)

Due to the modernisation, the new tankette was significantly changed from the British original, and that is why on February 13, 1931, it was accepted for service under the "T-27" designation. The T-27 was manufactured simultaneously in two factories: the Bolshevik factory in Leningrad, and the newly-built automobile factory in Nizhnij Novgorod (later it was named GAZ).

The hull of the T-27 was assembled of rolled-armor plates

which were fastened by rivets and partially welded. On the roof there were two squared hatches. All joints of the armor plates were pressurised by canvas gaskets to increase the fording depth of the T-27. The tankette was armed with one 7.62 mm DT Machine-Gun Model 1929. The T-27 didn't have any internal and external communication devices, as communication between vehicles was supposed to be conducted through signal flags, which was typical for Soviet tanks of that time.



The summary output of the T-27.

The vehicle was powered by the GAZ-AA water-cooled four-cylinder gasoline engine (copied from the Ford-AA) rated at 40 h.p at 220 rpm. The crew consisted of two men: the commander/machine-gunner and the driver.

The tankette was used for reconnaissance by mechanized forces of the Red Army. Until the end of 1932, 65 tankette battalions were formed, with about 50 tankettes per battalion. In the future, the number of those battalions was restricted to 23.

At the inception of the Red Army's mechanised forces, the T-27 tankettes played a very important role, but later on, this role was reduced due to the development of more

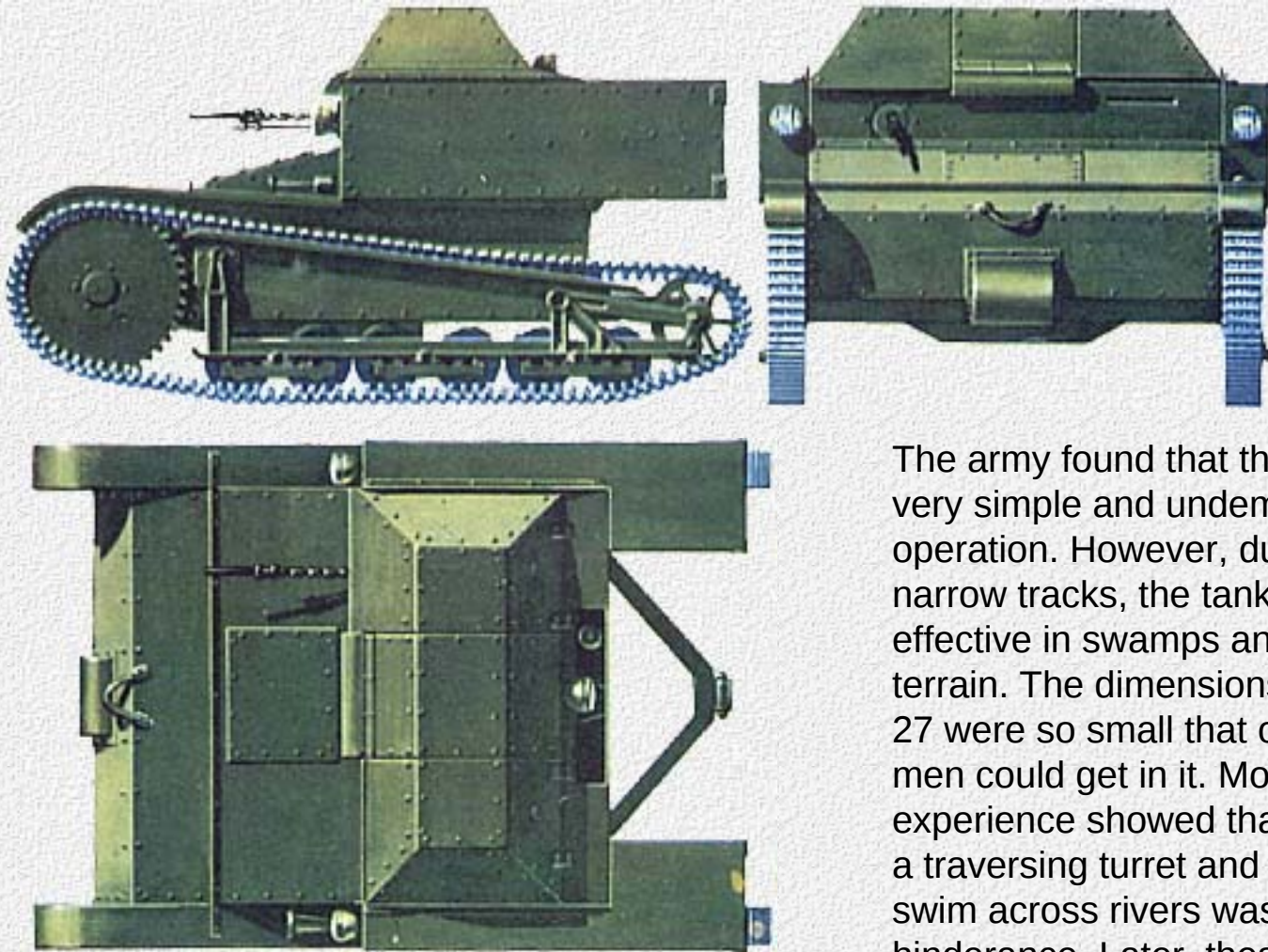
modern vehicles. By January 1, 1937, 2,547 T-27s remained in service.

In the beginning of the 1930's, T-27s were successfully used in Central Asia (in the Kara Kum Desert in particular) to combat the Basmach (the name for any anti-Bolshevik Asiatic natives). By the end of the 1930's, the T-27 was removed from Red Army front-line service, and thereafter used for training purposes. In addition, some tankettes were sent to the OSOAVIAKhIM (The Association for Assistance of Defense, Aircraft and Chemical Development). After some improvements, T-27s were used for towing battalion field guns (37-mm and 45-mm calibres).



T-27s on the military parade in Moscow. (CMVS)

By January 1, 1941, 2,157 T-27 tankettes remained in service, and some of them took part in the initial stages of the Great Patriotic War. The last mentioned combat use of T-27s was during the Battle for Moscow (winter 1941-42): on December 1, 1941, some T-27 tankettes supported the attack of the 71st Independent Marine Brigade in the Yakhroma area.

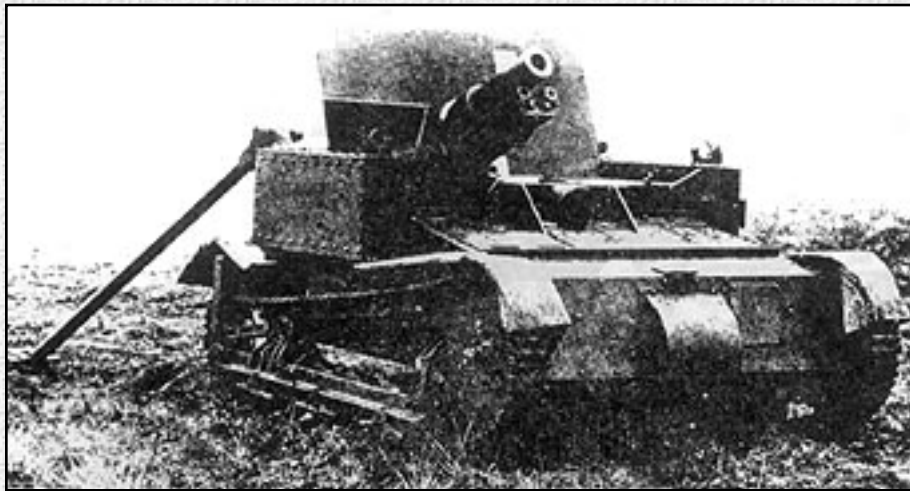


The army found that the T-27 was very simple and undemanding in operation. However, due to its narrow tracks, the tankette wasn't effective in swamps and snowy terrain. The dimensions of the T-27 were so small that only shorter men could get in it. Moreover, experience showed that the lack of a traversing turret and an ability to swim across rivers was a hinderance. Later, these features

were realised in the T-37 and the T-38 light tanks.

The Soviets tried to enlarge the tactical abilities of the T-27. For example, in 1933, a small batch of self-propelled 37-mm Hochkiss guns was manufactured by the Bolshevik factory in Leningrad. These SP guns were based on the chassis of the T-27. Some of those vehicles were additionally armed with the DT machine-gun. Because the vehicle was very small, the ammunition load was located separately in the tracked trailer that was towed behind the vehicle.

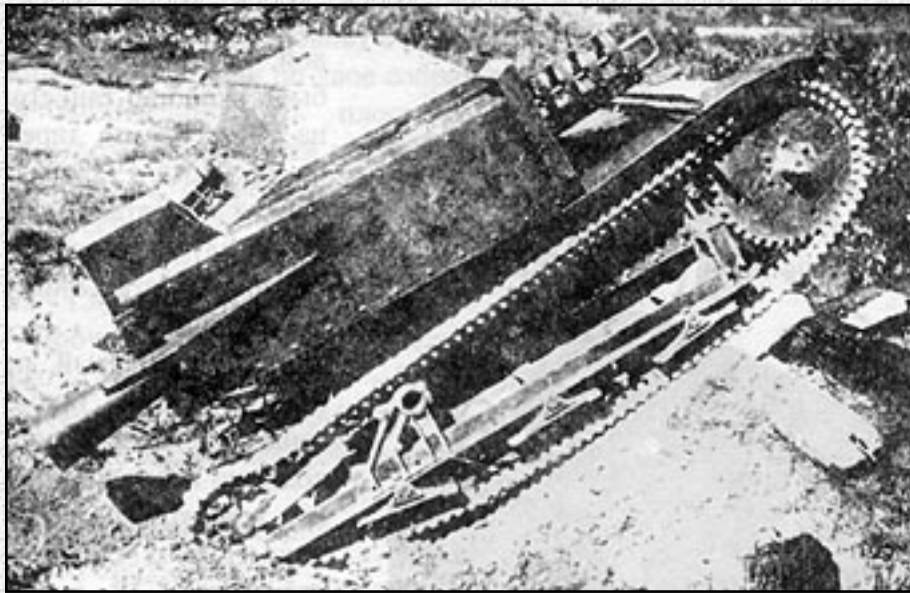
In 1932, one T-27 was rearmed with a flamethrower (the flamethrower had a range of 25 metres). This vehicle was tested in 1932, and in 1935 a batch of 164 flamethrower tankettes was produced. Combat records for these vehicles are not yet available.



The SP-Gun with the 76-mm Gun KT-27

In 1933 to 1934, the Special Design Bureau of the Krasniy Putilovetz factory designed a self-propelled gun in which the 76.2 mm KT gun was mounted on the T-27's chassis. The gun was carried by one vehicle, and the crew and ammunition were transported in a second vehicle. The project and five experimental vehicles were intended for support of Red Army motorised troops.

The gun was either mounted in the open or was protected by an armored shield (like common field guns). However, the chassis was overloaded, and the new vehicle was unable to run off-road because its engine quickly overheated. Further work was cancelled.



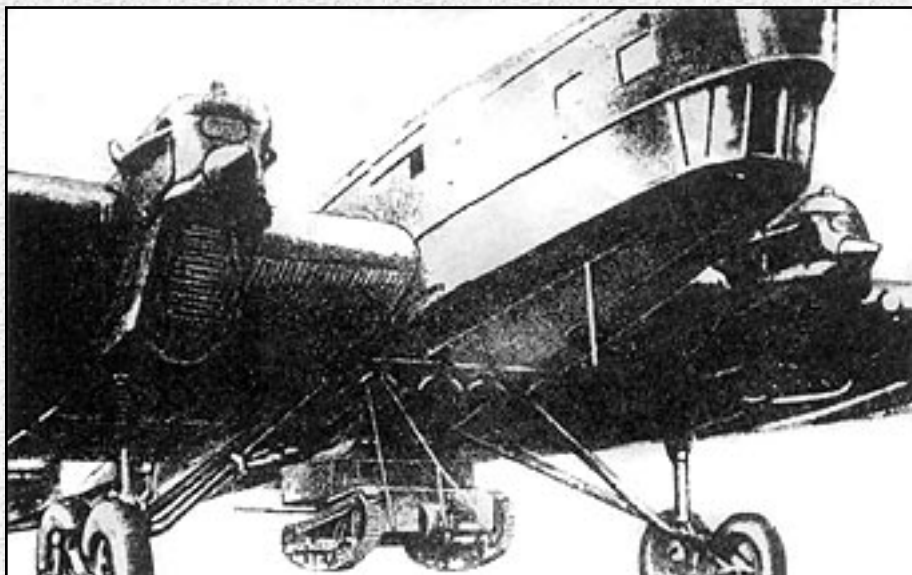
The T-27 armed with the Kurchevsky's 76-mm recoilless gun

In 1933, a self-propelled gun armed with Kurchevsky's 76-mm recoilless gun was developed. The vehicle successfully passed all tests on the proving ground and was sent to the army's trials which it failed because of the poor ballistics of the gun. The gun was also unstable when it fired and it was unsafe to operate.

Grokhovsky's Design Bureau also developed a tankette armed with two unguided missiles. These missiles were located on both

sides of the hull.

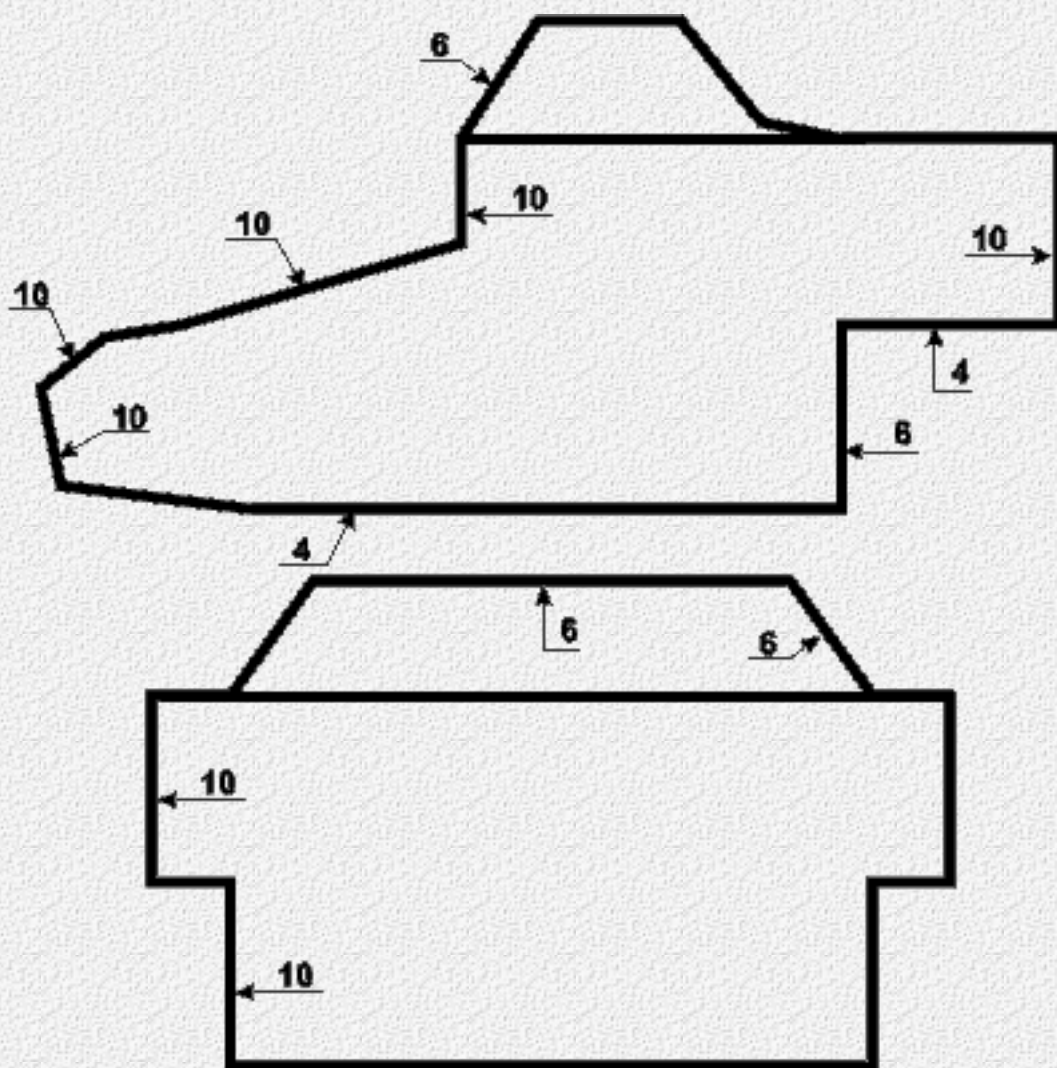
Several T-27s were pressurised and supplied with special equipment for underwater river crossings.



In March of 1930, ordered by M. N. Tukhachevsky, the first motorised airborne forces were formed. Initially, the troops were equipped with MS-1 light tanks, but later on they were replaced with T-27 tankettes. The troops consisted of four battalions. By 1933, each battalion included one company of T-27 tankettes.

In 1935, T-27's were transported by TB-1 and TB-3 bombers during military manoeuvres. The tankettes were suspended under the planes by a special mechanism developed by engineer A. F. Kravtzev.

the planes by a special mechanism developed by engineer A. F. Kravtzev.



REFERENCES:

[Blueprint of the Italian C.V.29](#)

[Blueprint of the Soviet T-27](#)

[Specification of Soviet tanks](#)

[Specifications of Soviet tank guns](#)

Proof-reader:

[Mark Jaremco](#)

Sources:

Bronekollektsiya #1, 1998;

V.N.Shnurkov "Weapons of the Red Army", Minsk, 1999;

Modelist-Konstruktor #9, 1991;

"Light tanks and armored cars of the Red Army", Moscow, 1996;

"Tanks", Smolensk, 2000;

Bruno Benvenuti "Carri Amati" vol.1, Roma

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The T-40 Light Amphibious Tank

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The T-40 Light Tank. Summer 1941. *(M.Dmitriev)*

Development history

In the Red Army's system of tank classification, light tanks (with weight up to 6 tons) were used by infantry and cavalry units for reconnaissance, combat with enemy landing forces, and guard duty. Their very light protection, weak armament and small crew were compensated for by their mobility, small dimensions (especially length), very good maneuverability on rough terrain, and amphibious ability. In the 1930's, the Red Army had two models of light tanks: the T-37 and the T-38.

Soviet industry wasn't overburdened by manufacturing these tanks because their construction was very simple and cheap. Their production didn't demand scarce heavy armor plates or powerful engines. Therefore, such vehicles could be produced in less-specialized factories in large quantities. Since 1931, Moscow Factory #37 had developed several models of light tanks: tankette T-27 and T-27A; amphibious T-37A and T-38 (several versions); as well as the armored tractors "Pioneer" and "Komsomolets".

At first, the T-38 was based on the Ford-AA engine. Later they were replaced with GAZ-AA and GAZ-M versions. The differential gear of the T-38 did not provide the vehicle with



The T-40 light tanks before battle. Moscow Front. Winter 1941-42.

steady motion, so in 1936 it was replaced with more reliable and steady side-friction clutches with band brakes.

However, by 1938, the design of the T-38 had become obsolete, so the Red Army was in need of a new amphibious reconnaissance tank. The armor of this tank would have to protect from armor-piercing projectiles as well as from shell fragments. Sloped armor, increasing the tank's firepower, and

the installation of a radio were some features considered for the new tank.

At the end of 1938, a special Research Department of factory #37 under Chief Engineer N.A.Astrov, undertook a new project, "010". The new hull and chassis were developed before the turret. The crew consisted of two men: a driver (located in the front of the hull) and a commander (in the turret). The design of the new vehicle allowed access to the engine from inside the vehicle once an armored partition was removed. The transmission was in the front of the vehicle as in the T-38. At the rear there were two fuel tanks of 100 liters each. The tank had a screw propeller and two rudders with armor protection to protect them from damage (from bullets, shell fragments and so).



The T-40 light tank.

Additional steps were made to improve the amphibious ability of the tank; the silhouette was improved, a special water deflector had been added, and all hatches were hermetically sealed. All of this allowed the T-40 to cross rivers with strong currents as well as through choppy seas (up to sea force 3). However, to be on the safe side, the crew was equipped with lifebelts.

In comparison with the T-38, the new vehicle was much better-armed with the large-calibre 12.7 mm DShK, and the 7.62 mm DT machine-guns. The machine-guns were paired and installed in one armored mount. The range of the DT was 1000 metres, and the range of the DShK was 4000 metres. The DShK had explosive, armor-piercing B-30, and incendiary armor-piercing B-32 bullets. The steel-cored B-30 bullet had a muzzle

velocity of 850 m/s, and was able to penetrate 16 mm of vertical armor from a distance of 300 m. The tank was therefore able to combat low flying aircraft although such encounters were extremely rare. Both machine-guns were supplied by Kovrovskiy Factory #614. During Great Patriotic War, they were also produced in the Izhevskiy Industrial Plant #622.

The commander had three periscopic sights, and the driver had two. To navigate on water, in fog, and at night, the vehicle was equipped with a magnetic compass from the Moscow factory "Aviapribor." There was a 71-TK-3 radio (range 16 km) which was installed to the right of the commander's position.



**Column of T-40 is going to the front.
Western Front. Winter 1942.**

The development of amphibious tank "010" was finished in the spring of 1939. In July 1939, Soviet industry built four experimental vehicles, and two more at a later date. They were equipped with imported Dodge engines and D-5's (76 h.p. or 85 h.p.), due to a lack of domestically-produced power plants. Some first series T-40's were equipped with these engines as well.

In July and August 1939, two "010's" (which had received the designation T-40) had been tested on both land and water. The results were sent to Moscow factory #37 with orders to fix all of the defects which were found. The length of the vehicle was increased by 120 mm, and it's width was increased by 50 mm. The height of the vehicle was lowered by 20 mm. A new engine, the GAZ-202 (GAZ-11), was mounted.

Upon GKO's #443ss decree of 19 December 1939, the new tank was accepted into service. This decree also ordered that; Moscow factory #37 was to produce three experimental T-40's by 1st March 1940, ordered the first production of 15 vehicles by 1 August 1940, and ordered the set up for mass production not later than 1st October 1940.



Soviet soldiers investigating a T-40 that was knocked out at the beginning of the war. Sinyavino, Volkhov Front. September 1942.

production of the T-40 was begun in October 1940. By the end of that year, the factory planned to produce 100 T-40 tanks, but had finished only 37 (plus six experimental tanks). In 1941, production had been increased, and by 22 June 1941, the factory had produced another 179 tanks.

The Red Army's need of tanks was so great that even weak tanks were needed badly. To increase the output of T-40's, the factory simplified construction of the vehicle. First of all, all the amphibious features and radio were removed. In July, 60 modernised tanks were built. According to archival documents, those tanks had the same name, but after the war they were renamed T-40S (where "S" means "sukhoputniy" or "overland"). The hull silhouette of the modernised tank was left unchanged. In spite of frequent requests, the armament of the T-40S wasn't changed.



The T-40S light tank.

In the summer of 1940, G.K. Zhukov (Chief of the Soviet General Staff) and S.K. Tymoshenko (Soviet Minister of Defense) inspected factory #37. Zhukov was especially interested in the T-40 light tank, and the capabilities of factory #37 in general. He ordered the refit of some facilities to improve their output.

After an extensive refit of Moscow factory #37, and the setup of the newest technology and machine tools, the mass

However, in the Kubinka tank museum, there is a T-40S armed with a TNSh-20 automatic gun, but this is an experimental vehicle as all the operational T-40's and T-40S' were lost in battles. Similarly, a T-38 with a similar modification (i.e. with the TNSh-20) is now in Moscow's Central Museum of the Armed Forces.

In July 1941, the Narkomat of Weapons ("Narkomat" means



The T-30 light tank.

Ministry) issued a decree to mount a 23 mm BT-23 (MP-6) automatic aircraft gun ("BT" denoting its main designers Baburin and Taubin). However, on 4 August 1941, firing tests of this gun gave negative results, so the gun was not installed on production vehicles.

From July 1941, the factory started producing the T-40S with flat rear armor plate (i.e. without a

cavity for a screw propeller). Frontal and side armor of the hull was increased to 15 mm, and the frontal and side turret armor was increased to 20 mm. The vehicle had fully welded armor of homogenous steel. Unofficially, this vehicle received the "030" or T-30 designation. From September 1941, some production T-30's were armed with the 20 mm ShVAK automatic tank gun (with 750 rounds of ammunition), which was in the last stage of development.

In total, 443 vehicles were produced in 1941 in three different versions. However, these variants were never accepted by the Red Army, the T-30 designation was abandoned, and all the vehicles were designated simply as T-40's.

In general, the T-40 was a successful tank. Interestingly, even after the end of World War II, its main parameters (protection, armament, amphibious ability) were still satisfactory for the task of a light reconnaissance vehicle as compared with other post-war vehicles such as the ASU-76 (1949) and ASU-57P (1954).



The T-40 in action



The T-40S light tank in Kubinka museum.

(V.Potapov)

In the battles in which the T40's were first used, Soviet commanders tried to use the T-40's as regular tanks (like the [T-26](#), [BT's](#) and so on). T-40's were never used in their intended reconnaissance role but were used for other, unintended tasks. Most of them were lost in battle without distinguishing themselves. The T-40 was used the most during the Moscow battles (winter 1941-1942). However, some of them took part from the beginning of the Great Patriotic war. They were very successful in marshes where heavier tanks couldn't pass.



T-30 light tank in Kubinka museum. (V.Potapov)

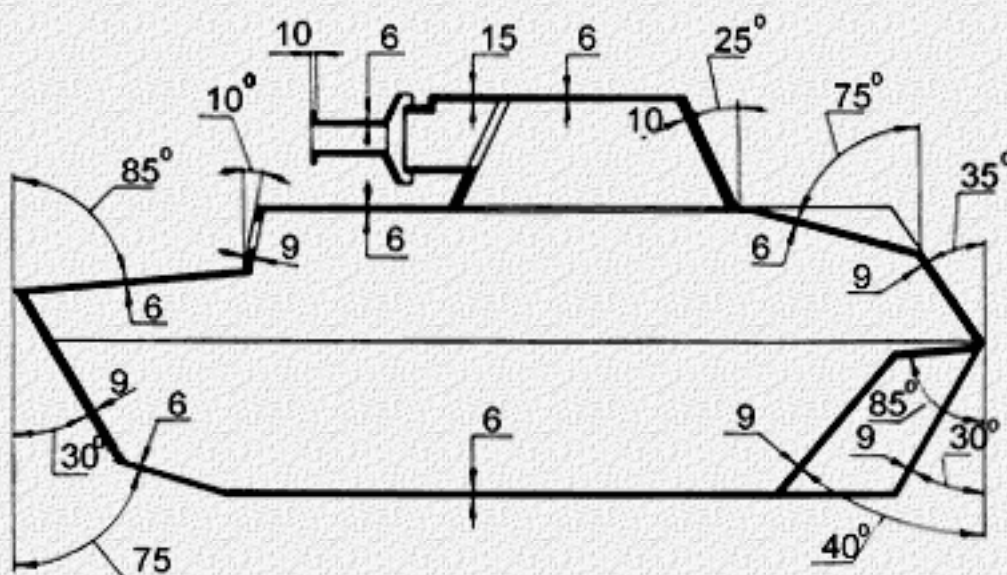
provided invaluable service to the Red Army.

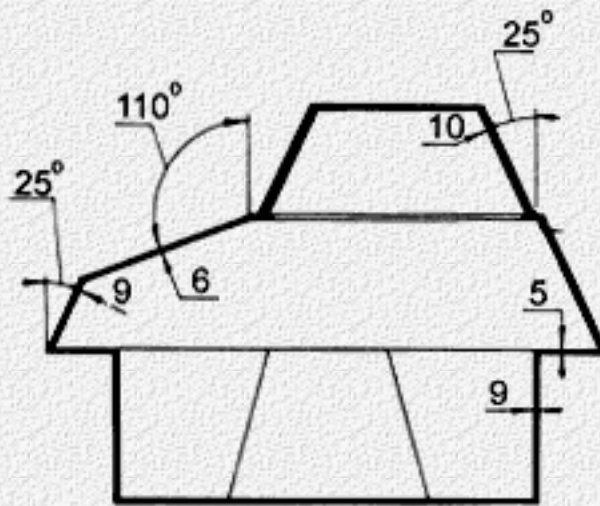
That's why the Red Army's entire complement of T-38's were concentrated for the crossing of the Svir' River. By 1946, T-40's were relegated to use as training vehicles.

T-40 light tanks were used in tank brigades of mixed composition. For example, in the 8th Tank Brigade (commanded by Colonel P.A.Rotmistrov, and formed in August-September 1941), there were 61 tanks which included seven [KV-1's](#), 22 [T-34/76's](#) and 32 T-40's.

By mid 1941, the T-40 almost disappeared from the battlefields. However, during later crossings of large rivers (like the Dnieper, Dnestr and others) these tanks

The armoring scheme of the T-40





REFERENCES:

[Specification of Soviet tanks](#)

[Specifications of Soviet tank guns](#)

Proof-reader:

[Mark Jaremco](#)

Sources:

"The T-40 tank. Operational manual", Voenizdat 1941

"The 20 mm TNSh (ShVAK) tank gun. Operational manual", Voenizdat 1942

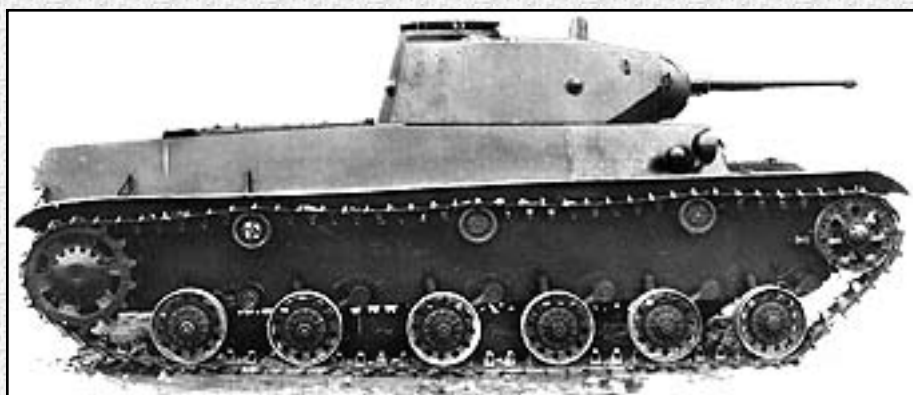
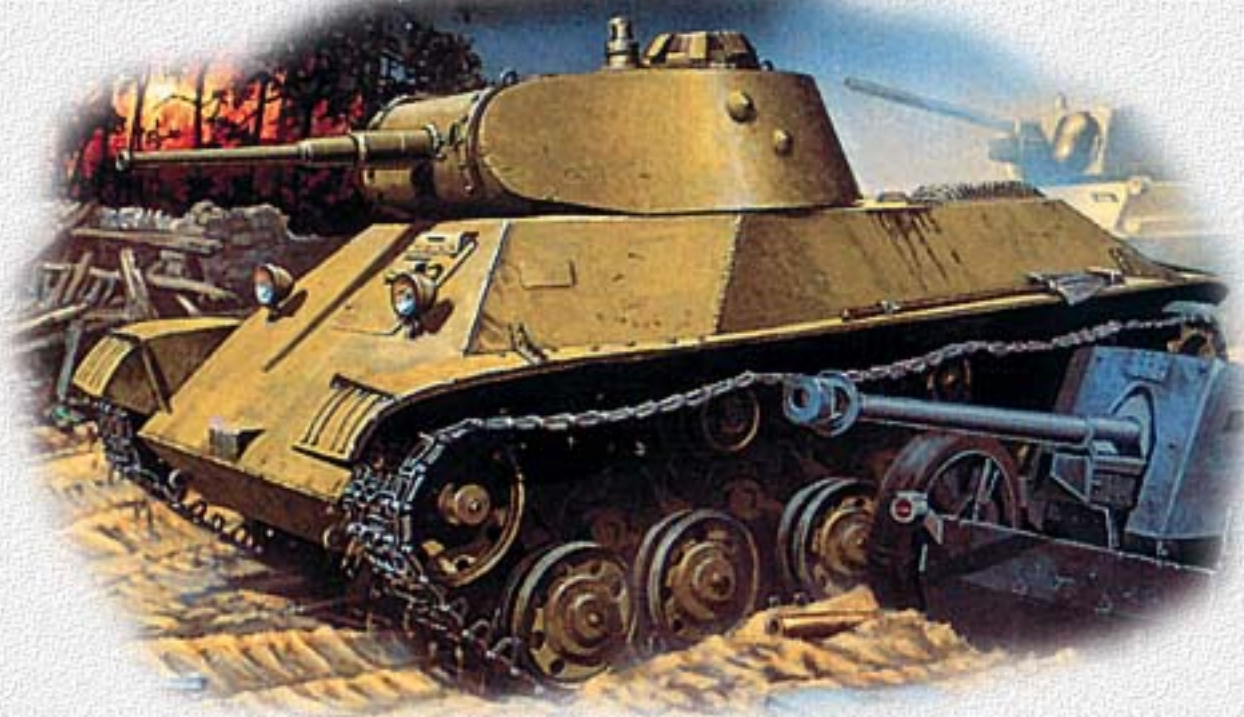
"Bronekollektsiya", #4 1997

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The T-50 Main Battle Tank

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**T-50 Main Battle Tank designed by Kirovsky
Factory. 1941**

Despite the development of the formidable T-34, the idea of a new mass-produced tank emerged inside the Soviet military circles. So two Soviet factories in Leningrad (Kirovsky factory and Voroshilovsky factory #174) were ordered to develop a new 14-ton tank armed with 45 mm gun and protected by medium armor, similar to T-34.

In 1939, the Kirovsky factory was ordered to develop a light CS tank (close support tank). In 1940 the first prototype, named "Object 126" or T-126SP, was developed, manufactured and tested. Its protection was equal to the T-34's: its welded hull was assembled from 37 mm homogeneous armor plates; its roof was composed of 20 mm plates. Frontal, upper side and rear armor plates were sloped 40-57 degrees.



"Object 126" in tank museum in Kubinka. *(E.Boldyrev)*

The new tank did have the [45mm Tank Gun Model 1932/38](#) supplied with 150 rounds plus a coaxial 7.62 mm DT machine-gun. Additionally, it was armed with the 7.62 mm DS bow machine-gun. The tank was powered by a 250 hp V-4 diesel engine, which provided the 17-ton vehicle with a maximum speed of 35 km/h.



**T-50 tank designed by Voroshilovsky
Factory. 1942.**

The tank had torsion bar suspension. Its chassis consisted of six steel road wheels (each with internal shock absorber), idler, rear driver wheel with removable coggod rim, and three support wheels. The transmission consisted of the two-disk main friction clutch, the 4-speed gearbox, multiple-disk side clutches and side gears.

Measured by aggregate armament and protection, "Object 126" was superior to most of the Soviet light

and medium tanks of that time. In fact, the German Pz-III played a notable role in

development of the "Object 126". Having many advantages, the Soviet tank had some disadvantages as well. First of all, it had limited range and little room for crew. On the second prototype the internal room was increased by removing the DS machine-gun. The second prototype received new lighter road wheels with rubber tires. Simultaneously, at LKZ factory (Kirovsky factory) engineer L.S.Troyanov developed another variant, named "Object 211". Both tanks were sent to comparison trials which the first tank ("Object 126") won. On February 12, 1941, "Object 126" was accepted for service and named T-50. T-50 was intended to be the most mass-produced Soviet tank.



The T-50 tank. (V.Potapov)



The T-50 in Kubinka. (V.Potapov)

In their construction the T-50 and the "Object 126" were quite similar. Like its prototype, the T-50 had well-sloped welded armor. The driver's hatch was located in the upper frontal armor plate. Bow machine-gun was absent. T-50's design was hi-tech and weighed only 13.5 tons, with 37-mm frontal armor on hull and turret. The three-man conical turret had a commander's cupola with six

vision slits. The turret was welded, of conic form, with flat rear armor hatch. The T-50 was still armed with the 45-mm 20K gun model 1932/38 and one coaxial 7.62 mm DT TMG.

The T-50 had the torsion bar suspension with road wheels with internal shock absorbers. The tank was powered by 300 hp V-4 diesel engine (specific power - 21

hp/ton). Average ground pressure - 0.57 kg/cm², top speed - 60 km/h. All tanks were equipped with radio.

On those times point of view, the T-50 was intended to be a kind of "universal" tank and should replace T-26s and BTs light tanks.

Here I would like to notice, the T-50 wasn't light tank, also it wasn't intended to be light. According to the nomenclature of that time, the T-50 was rather a support tank for motorised and mechanised troops of the Red Army.

At that time, an artillery testings conducted at NII-48 Research Lab. These tests proved the T-50 couldn't be penetrated by the Soviet 76 mm Gun Model 1939 at 400 metres at any angle. Moreover, during these tests, the T-50 wasn't penetrated by the ex-German PaK 40 antitank gun, while the T-34 was penetrated three times.



The T-50 in Kubinka. (E.Boldyrev)

In April 1941, the T-50 was accepted for service. Until the beginning of the Great Patriotic War, factory #174 produced not a single T-50, however. The most serious problem was with V-4 engine that was in fact very unreliable and expensive. Till the end of war, Soviet industry was unable to build an efficient and reliable V-4. Through extreme efforts Soviet industry was able to produce 50 tanks during the

second half of 1941. An attempt to set up mass production of T-50 at Factory #37 in Moscow failed.

In August 1941, the Factory #174 was evacuated: mostly in Omsk, but several parts in Nizhnij Tagil and Barnaul. On October 13, 1941, the GOKO issued an order to build two new factories in Barnaul: the first to manufacture T-50s and the second to manufacture diesel engines for the T-50. However, in January 1942, the manufacture of the T-50 and



The T-50 in Kubinka. (E.Boldyrev)

its engines was cancelled and never resumed. Factory #174 in Omsk manufactured 15 T-50s, but then was switched to building T-34s.



The T-50 in Kubinka (E.Boldyrev)

History has left few combat records of this very interesting tank. I know only that T-50 tanks manufactured in Leningrad served in one of the Soviet tank brigades on the Karelian Isthmus. Some were captured by Finns and used till the end of war (1944).



The Finnish T-50 with additional armor protection. January 1944.

The T-50 was well armed and heavily armored. His speed and maneuverability was much better than the T-34. Also, the commander's cupola and restricted duties of the tank commander were also important improvement (comparing to the T-34). The steel intensity of the T-34 was twice as much than T-50. So, why the production of such advanced tank was ceased? In

fact, there were three reasons. At first, the mass production was tried to set up after the beginning of the Great Patriotic War. At second, from autumn 1941, the Red Army began to receive British [Valentines](#), which were quite close to the T-50 (with exception to maneuverability). At third, there were no available factory ready to produce V-4 engines.



That's why the fate of the T-50 was so short. Only 69 T-50 tanks were manufactured; after that it was finally removed from production.

Important to mention there were two types of T-50 distinguished by different armor thickness: the first one was 37-41 mm, the second one was 55-57 mm.

It's important to mention another variant of T-50: the "Object 211", which was developed by LKZ's Design Bureau headed by A. S. Ermolaev. It had a welded hull and conical turret. The armament and engine were the same as the production T-50, though "Object 211" was lighter. Anyway, it didn't have any superiority over production T-50. Only one vehicle was manufactured and that was before the war.

After the beginning of the Great Patriotic War, all further works on this project were cancelled. The single "Object 211" was used in defense of Leningrad and its further fate is unknown - list it as "missing in action".



The T-50 tank. The slogan "Tambovskij volk" (A Tambov's wolf) is painted on the



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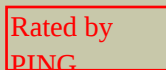
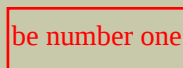
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Correspondence about mounting the 100 mm D-10T Gun on "JS" tanks:

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[Order of the commander in chief concerning the employment of artillery shrapnel](#)

[Order of the commander in chief concerning deficiencies in the employment of antitank rifles](#) 

- [Concerning the under appreciation of antitank rifles and antitank grenades](#) 

[Order concerning broad employment of fire obstacles in defensive systems](#) 

ORDERS, AFTER BATTLE REPORTS, PLANS

[The Stavka order #227. July 28, 1942](#)

[Decree of the Central Front's Military Council. April 4, 1943](#)

[German Directive #1 for the Conduct of the War. 1.09.39](#)

[Ultimatum of Soviet HQ for the German forces encircled at Stalingrad. 8.01.43](#)

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ESPIONAGE

War preparations:

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45MM TANK GUN MODEL 1932/38

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20K GUN SPECIFICATION

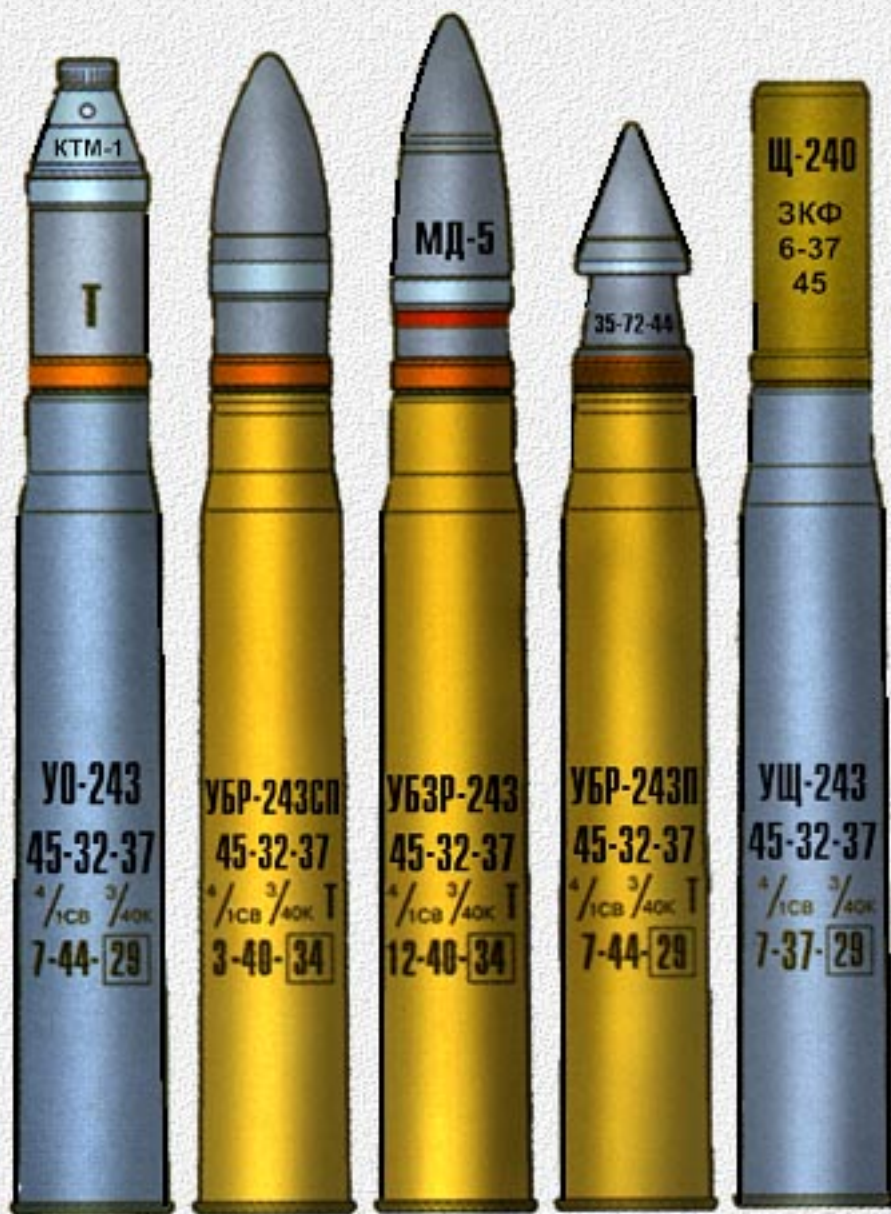
Parameter	Value
Calibre, mm	45
Bore lenght, clb	46
Weight of pendulous elements, kg	313
Weight of recoil elements, kg	113
Normal recoil length, mm	240-270
Max recoil length, mm	278
Max range, m	~4200
Ammunition	fixed
Ballistic	45mm anti-tank gun mod.1932
Practical ROF, shot/min	7-12

ARMOR PENETRATION TABLE

Projectile	V, ì/ñ	Engagement angle, degrees	Range, m			
			100	300	500	1.000
BR-240SP	757	60°	43	36	31	28
		90°	51	43	38	35

At the end of 1931, the designers of Factory #8 installed a new 45mm barrel on the gun-carriage of the 37mm Anti-tank Gun Model 1930 and slightly strengthened it. The new gun was accepted for service in March 1932, under the designation of "45-mm Anti-tank Gun Model 1932"; the gun's factory designation was - "19K". Afterwards, the designers of Factory #8 redesigned the 19K field gun to allow a tank installation; it received the designation of "45-mm Tank Gun Model 1932" and, correspondingly, the factory designation of "20K".

Compared to the B-3 gun, the 20K Tank Gun had a number of advantages. The armour penetration of the AP rounds was somewhat improved. The weight of the fragmentation



Projectiles for the 20K Gun:

- UO-243 round with fragmentation projectile O-240;
- UBR-243SP round with armor-piercing solid projectile BR-240SP;
- UBZR-243 round with armor-piercing incendiary projectile BZR-240;
- UBR-243P round with armor piercing sub-caliber (APCR) projectile BR-240P;
- UShe-243 round with canister projectile She-240.

projectile was significantly increased from 0.645 kg to 2.15 kg, and the weight of the explosive charge in this projectile was increased from 22 grams to 118 grams. Lastly, the rate of fire was increased after introducing a vertical wedge semi-automatic breech block, though the refining of the semi-automatic operation took around four years. The first batches of 20K guns were manufactured with the ? automatic operation. Later versions were fitted with semi-automatic operation for armour-piercing rounds and ? automatic operation for high explosive fragmentation rounds. The first deliveries of the guns with the properly refined semi-automatic operation for all the kinds of ammunition began in 1935. The 20K gun had a disadvantage: it did not fit into the

small turrets of the [T-26](#) and [BT-2](#). Theoretically, it could be "crammed" into the turret, but that required the introduction of a balancing mechanism, a new elevation mechanism, and thus left only enough room for one crewmember. There was no space for a second crewmember. The RKKA High Command did not approve of this, and the T-26 and BT tanks began to be manufactured with a new large turret - correspondingly the single

turret T-26. This version of the T-26 tank with the 45-mm Tank Gun Model 1932 was delivered to NIAP on 31 May 1933.

Since 1932, the 20K gun had been in production at Factory #8. Ten guns were produced in 1932; 2099 in 1933; 2005 in 1934; 2443 in 1935 and so on. Altogether, 21564 20K guns had been produced by January 1, 1941.

Factory #8 received an order to produce 2664 45mm 20K Tank Guns in 1941. There were no plans to cancel production of the 20K in the near future, because they were to become the armament for the new main tank ([T-50 or T-126SP](#)). Actually, 2759 guns were produced in 1941.

Since 1942, production of the 20K was transferred to Factory #235 where 5090 guns were manufactured in 1942, and 3040 were produced in 1943. Production of the 20K was then finally stopped. From the beginning of the 1930's to mid-1943, a 45mm gun system remained practically the only anti-tank gun. This was a result of these guns being able to penetrate the armour of any German tank, prior to 1942, from up to 500 metres. Theoretically, they were superior to the German 37mm Pak36, as they had a more effective HE capability. However, on practice it was doubtful due to some flaws with AP ammunition issued in 1941; firing tests indicated certified penetration was about 18-20mm at 500 metres while all sources of that time claimed 35-40mm. Flaws occurred due to over-heat the AP projectile so its nose tended to brake up in pieces during impact.

The 20K had undergone several modifications. For instance, the Model 1934 gun differed from the standard prototype (Model 1932) in design of the semi-automatic mechanism, recoil systems, elevation mechanism etc. The Model 1938 gun featured the introduction of an electric firing mechanism. Our website lists all these artillery systems under the common designation of "45mm Tank Gun Mod.1932/38", to avoid repeating insignificant details.

In 1938, the TOS gun-sight with stabilisation of the line of fire in the vertical plane was developed for the 45mm Gun Mod.1938 with the electric firing mechanism. Stabilisation was achieved by way of a gyroscope hung in the front section of the sight's housing. Some T-26 and BT-7 tanks were equipped with the TOS, but this system was taken out of service at the beginning of the war. This was done because it was not properly mastered by combat units; and also due to some shortcomings in design and operational service for which there was no time to address in that difficult period.

Several years before, in 1936, an experimental prototype of the automatic loading mechanism for 45mm tank guns was designed by engineer Rozhdestvenskiy. It was manufactured at the Military Electro-technical Academy of RKKA. Factory #8 was assigned to refine this mechanism and start its mass production, although it had not begun this assignment after two years, and later it rejected the assignment altogether.

In 1938, the 45mm Automatic Tank Gun VETOG, with an automatic belt fed ammunition

mechanism patterned after the 37mm Maxim Gun, was created in NITI on the basis of the 20K. In the same year, the Artillery Directorate decided to cancel all work on the "VETOG" gun for the following reasons:

"Factory #8 works on 45mm and 37mm automatic guns. Only the one that is finished earlier will be recommended for use in teletanks (remotely controlled tanks)"

The work to create the 45mm armour-piercing chemical (APCh) projectiles for the 19K (field) and 20K (tank) guns is also quite interesting. Such a projectile would explode behind the tank's armour (i.e. inside the fighting compartment) and would produce poison gas to kill the crew. In 1934, the trials of the 45mm APCh projectile by "Blueprint #180" were commenced in NIAP. Unfortunately, the trials results still remain top secret to this day.

Usage

The 20K Gun was used as armament for the following tanks:

Production tanks: [T-18M](#), [BT-5](#), [BT-7](#), [BT-7M](#), T-26 Model 1934-1939, T-50, T-70, T-80, [T-35](#), [KV-8](#), [KV-8S](#).

Production armoured cars: [BA-3](#), [BA-6](#), BA-10, BA-11 è PB-4.

Experimental tanks: [A-20](#), [A-32](#), [SMK](#), T-100, [KV-1 Model 1939](#), [KV-4](#), [KV-7-I](#).

AMMUNITION FOR THE 20K GUN

SHELL		PROJECTILE					PROPELLANT CHARGE	
Index	Weight, kg	Index	Weight, kg	Length, clb	Weight of a charge, gram	Fuse	Index	Weight, kg
HIGH EXPLOSIVE, FRAGMENTATION								
UO-240	2.91	O-240	1.98	4.6	135	M-50	?	0.1
			2.14	4.6	118	KTM-1		or
			2.15	4.6	118	KT-1		0.115
UO-240A	2.91	O-240A ³	1.98	4.6	135	M-50	?	0.1
			2.14	4.6	118	KTM-1		or
			2.15	4.6	118	KT-1		0.115

ARMOR PIERCING								
UBR-243	2.45	BR-240	1.43	3.8	18.8	MD-5	?	0.36
UBZR-243	2.45	BRZ-240	1.43	3.8	12.5	MD-5	?	0.36
UBR-243SP	2.45	BR-240SP	1.43	3.8	N/A	N/A	?	0.36
UB-241	2.44	B-242	1.35	4.3	58	MD-2	?	0.1
UB-241M	2.44	B-241*	1.41	3.6	77	MD-2	?	0.1
ARMOR PIERCING SUB-CALIBER								
UBR-243P	1.84	BR-240P**	0.85	2.7	N/A	N/A	?	0.365 or 0.38
CANISTER AND SHRAPNEL								
UShe-243	2.36	She-240***	1.62	5.4	N/A	N/A	?	0.1
INCENDIARY								
n/a								
SMOKE								
n/a								

* Turned from 47 mm Hochkiss naval round;

** Developed and accepted for service on 1.04.42;

*** Canister with 137 bullets of total weight of 1,48 kg

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Sources:

"Artillerijskoye Vooruzhevie Sovetskikh Tankov 1940-1945" Armada-Vertical, #4, 1999

A.Shirokorad "Entsiklopediya Otechestvennoi Artillerii", 2000

M.Svirin, A.Beskurnikov "Pervie Sovetskie Tanki", Armada #1

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45MM TANK GUNS VT-42 AND VT-43

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20K GUN SPECIFICATION

Parameter	Value
Calibre, mm	45
Bore lenght, clb	68.6
Weight of pendulous elements, kg	?
Weight of recoil elements, kg	?
Normal recoil length, mm	?
Max recoil length, mm	?
Max range, m	?
Ammunition	fixed
Ballistic	new
Practical ROF, shot/min	?

EXPECTED ARMOR PENETRATION

Projectile	V, ì/ñ	Engagement angle, degrees	Range, m			
			100	300	500	1.000
Armor-piercing	950	60°	60	55	51	54
		90°	75	66	59	54

In 1942, a new modification of the field gun, the 45mm Antitank Gun Model 1942 (M-42) was created. It differed from the 19K in having an increased barrel length, from 46 to 68.6 calibres. In 1942-1943, the experimental prototypes of the 45mm "VT-42" and "VT-43" tank guns, with the barrel length of 68.6 calibres, were manufactured at OKB-172 based on the M-42. The VT-42 gun was intended for the T-70 tank, while the VT-43 was intended for the T-80 tank. These guns were never accepted into service.

Usage

VT-42 and VT-43 Gun were never used.

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Sources:

"Artillerijskoye Vooruzhevie Sovetskikh Tankov 1940-1945" Armada-Vertical, #4, 1999

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85MM TANK GUN S-18

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S-18 GUN SPECIFICATION

Parameter	Value
Calibre, mm	85
Bore lenght, clb	?
Weight of pendulous elements, kg	?
Weight of recoil elements, kg	?
Normal recoil length, mm	?
Max. recoil length, mm	?
Ammunition	fixed
Ballistic	new
Practical ROF, shot/min.	?



JS "Object 237" Tank equipped with S-18 mock-up.

The first Soviet 85mm tank gun was introduced in 1939. It was mounted experimentally on the T-28 and KV series tanks, but was dropped from production for a number of reasons. In late 1941 and early 1942, Soviet engineers independently designed numerous variants of the 85mm tank gun, however, it was at this time the opinion of the NKV and NKTP that this was not a practical avenue of investigation due to the greater cost of existing 85mm ammunition over similar 76mm ammunition, also there was no 85 mm HE projectile developed but only a fragmentation.

In 1943, after Germany introduced two new tanks (PzKpfw VIE Tiger and PzKpfw V Panther) to the battlefield, and insufficient effectiveness of the explosion power of the 76mm against field fortification, and



SU-85-I armed by S-18.



SU-85-IV armed by S-18.

interest in the 85mm weapons was reinvigorated. Projects outlined in 1941-1942 but not realized were revived. The most advanced was developed in "Kalinin" Factory #8 but it used a type of muzzle brake which considered to be inappropriate for a tank gun.

In connection with this, TsAKB began development of a project to create a new tank gun. In the winter of 1942-1943 it was completed using the S-18 tank gun, approved

by the NKV, and in March, 1943, Factory #9 built two prototype models (due to the fact that the TsAKB had no production capability available at this time). Production of the gun commenced slowly, and when they were finally ready for testing, it became clear that the gun shared the design problems of previous models. Design Bureau of Factory #9 under the directorship of F. Petrov was tasked with the design of changes. The TsAKB, under the administration of V. Grabin, continued on its own. Fortunately, neither rested in their efforts. Experimental weapons turned out to function normally, but the leaders and designers of the projects began to undermine each other's efforts. As a result, the first experimental tank "Object 237" was armed with a mock-up S-18 in its turret. After this, both S-18s were finished, and mounted in two prototype models of the SU-85 self-propelled gun - the SU-85-I and the SU-85-IV.

Usage

The S-18 Gun was used to equip the following tanks and self-propelled artillery:

Production tanks and SP-Guns: none.

Experimental SP-Guns: SU-85-I, SU-85-IV.

AMMUNITION FOR THE D-5, S-18, S-31, S-53, ZIS-S-53 GUNS

SHELL		PROJECTILE					PROPELLANT CHARGE	
Index	Weight, kg	Index	Weight, kg	Length, clb	Weight of a charge, gram	Fuse	Index	Weight, kg
HIGH EXPLOSIVE, FRAGMENTATION								
UO-365	15.95	O-365	9.2	3.4	0.646	T-5	G-365	2.48
UO-365K	16.3	O-365K	9.54	3.4	0.646	KTM-1, KTM-1-U	G-365	2.5
UO-365KV	14.95	O-365KV	9.54	4.1	0.67	V-429, KTM-1-U, KTM-1, KTMZ-1-U, KTMZ-1, MG-N	G-365	2.6
UO-365G	14.95	O-365G	9.54	4.1	0.741	KTM-1-Ó, KTM-1, KTMZ-1-U, KTMZ-1, MG-N	G-365	1.5-1.8
UO-367*	14.95	O-367	9.54	4	0.703-0.741	KTM-1	G-365	1.5-1.8
UO-367A*	14.95	O-367A**	9.54	4.2	0.67	KTM-1-U, KTM-1, MG-N	G-365	1.5-1.8
UO-367AV*	14.95	O-367AV**	9.54	4.1	0.67	V-429, KTM-1-U, KTM-1, MG-N	G-365	1.5-1.8

Óî-367AG*	14.95	O-367AG**	9.54	4.1	0.67	KTM-1-U, KTM-1, MG-N	G-365	1.5-1.8
ARMOR PIERCING								
UBR-365	16	BR-365	9.2	4.3	0.164	MD-5, MD-7	G-365	2.48-2.6
UBR-365K	16	BR-365K	9.2	3.1	0.048	MD-8	G-365	2.48-2.6
UBR-367*	16	BR-367	9.2	3.64	0.044	MD-8, DBR-2	G-365	2.63
ARMOR PIERCING SUB-CALIBER (HVAP)								
UBR-365P	11.42	BR-365P	4.99	3	N/A	N/A	G-365	2.5-2.85
UBR-367P*	11.72	BR-367P	5.3	3	N/A	N/A	G-365	2.5
UPBR-367*	11.72	PBR-367	5.3	3	N/A	N/A	G-365	2.5
SHAPED-CHARGE ANTI-TANK (HEAT)								
UBK-367*	14.95	BK-367 (BK-367M)	9.25	7	0.994	GKN	G-365	1.3
ZBK2* (ZBK2M)	14.95	BK2****	7.351	7	0.935	GPV-1, GPV-2	G-365	1.3
CANISTER AND SHRAPNEL								
n/a								
INCENDIARY								
n/a								
SMOKE								
UD-1	16.3	D-2	9.54	4.1	-	KTM-1-U	G-365	2.6
UD-2	14.95	D-2	9.54	4.1	-	KTM-1-U	G-365	1.5-1.8
UD-367	15.65	D-367 ²	10.07	4	-	KTM-2	G-365	1.5-1.8

* Developed after the end of WW2;

** Case made of cast iron;

*** Ballistic capped;

**** Fin-stabilised.

Written by:
[Valeriy Potapov](#)
Translated by:
[Chris Keeling](#)

Sources:
"Artillerijskoye Vooruzhevie Sovetskikh Tankov 1940-1945" Armada-Vertical, #4, 1999

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85MM TANK GUN S-31

◀ [MAIN MENU](#) [SOLDIERS AT](#)

[WAR](#) [DOCUMENTS](#) [BATTLES](#) [TANKS](#) [ARTILLERY](#) ▶

S-31 GUN SPECIFICATION

Parameter	Value
Calibre, mm	85
Bore lenght, clb	?
Weight of pendulous elements, kg	?
Weight of recoil elements, kg	?
Normal recoil length, mm	?
Max. recoil length, mm	?
Ammunition	fixed
Ballistic	85mm Anti-Aircraft Gun Model 1939
Practical ROF, shot/min.	?



A 85mm Gun S-31 mounted in the standard turret of the KV-1S. (V.Potapov)

Simultaneously with the work on the [85mm tank gun S-18](#), the TsAKB developed yet another variant of the 85mm tank gun. This weapon, given the nomenclature S-31, was designed for mounting on the heavy tanks [KV-1S](#) and [JS](#), for which reason two separate variants were created - one with a standard ballistic of the 85mm Anti-Aircraft Gun (muzzle velocity of 790-800 m/s), the other with a higher ballistic (muzzle velocity of 920-950 m/s).

The model with the higher muzzle velocity was developed for mounting in the IS-4 tank in place of the [107mm ZIS-6](#).

Manufacture and trials conducted by Factory #92. In comparison to the S-18, this weapon was simpler and better made. However this weapon, with its higher

muzzle velocity, required a new round with a larger case to be developed. Because of poor communications and a delay of the decision, they began to fulfill this order only at

the middle of October, 1943, which had been planned to be fulfilled by October 1, 1943. Due to this problem, all of the research on the high-velocity 85mm Tank Gun S-31 was put aside.

In the summer of 1943, a comparative trials were conducted on four separate tanks: IS-85 with S-18 gun and JS-85 with [D-5 Tank Gun](#), KV-1s with S-18 tank gun and KV-1s with D-5 tank gun. Trials demonstrated that more effectiveness could be wrung out of the D-5 gun, and it was this, which was mounted on the final versions.

Usage

The S-31 Gun was used to equip the following war-time tanks:

Production tanks: no.

Experimental tanks: KV-1S, JS-85.

AMMUNITION FOR THE D-5, S-18, S-31, S-53, ZIS-S-53 GUNS

SHELL		PROJECTILE					PROPELLANT CHARGE	
Index	Weight, kg	Index	Weight, kg	Length, clb	Weight of a charge, gram	Fuse	Index	Weight, kg
HIGH EXPLOSIVE, FRAGMENTATION								
UO-365	15.95	O-365	9.2	3.4	0.646	T-5	G-365	2.48
UO-365K	16.3	O-365K	9.54	3.4	0.646	KTM-1, KTM-1-U	G-365	2.5
UO-365KV	14.95	O-365KV	9.54	4.1	0.67	V-429, KTM-1-U, KTM-1, KTMZ-1-U, KTMZ-1, MG-N	G-365	2.6

UO-365G	14.95	O-365G	9.54	4.1	0.741	KTM-1-Ó, KTM-1, KTMZ-1-U, KTMZ-1, MG-N	G-365	1.5-1.8
UO-367*	14.95	O-367	9.54	4	0.703-0.741	KTM-1	G-365	1.5-1.8
UO-367A*	14.95	O-367A**	9.54	4.2	0.67	KTM-1-U, KTM-1, MG-N	G-365	1.5-1.8
UO-367AV*	14.95	O-367AV**	9.54	4.1	0.67	V-429, KTM-1-U, KTM-1, MG-N	G-365	1.5-1.8
ÓÎ-367AG*	14.95	O-367AG**	9.54	4.1	0.67	KTM-1-U, KTM-1, MG-N	G-365	1.5-1.8

ARMOR PIERCING

UBR-365	16	BR-365	9.2	4.3	0.164	MD-5, MD-7	G-365	2.48-2.6
UBR-365K	16	BR-365K	9.2	3.1	0.048	MD-8	G-365	2.48-2.6
UBR-367*	16	BR-367	9.2	3.64	0.044	MD-8, DBR-2	G-365	2.63

ARMOR PIERCING SUB-CALIBER (HVAP)

UBR-365P	11.42	BR-365P	4.99	3	N/A	N/A	G-365	2.5-2.85
UBR-367P*	11.72	BR-367P	5.3	3	N/A	N/A	G-365	2.5
UPBR-367*	11.72	PBR-367	5.3	3	N/A	N/A	G-365	2.5

SHAPED-CHARGE ANTI-TANK (HEAT)

UBK-367*	14.95	BK-367 (BK-367M)	9.25	7	0.994	GKN	G-365	1.3
ZBK2* (ZBK2M)	14.95	BK2****	7.351	7	0.935	GPV-1, GPV-2	G-365	1.3
CANISTER AND SHRAPNEL								
n/a								
INCENDIARY								
n/a								
SMOKE								
UD-1	16.3	D-2	9.54	4.1	-	KTM-1-U	G-365	2.6
UD-2	14.95	D-2	9.54	4.1	-	KTM-1-U	G-365	1.5-1.8
UD-367	15.65	D-367 ²	10.07	4	-	KTM-2	G-365	1.5-1.8

* Developed after the end of WW2;

** Case made of cast iron;

*** Ballisctic capped;

**** Fin-stabilised.

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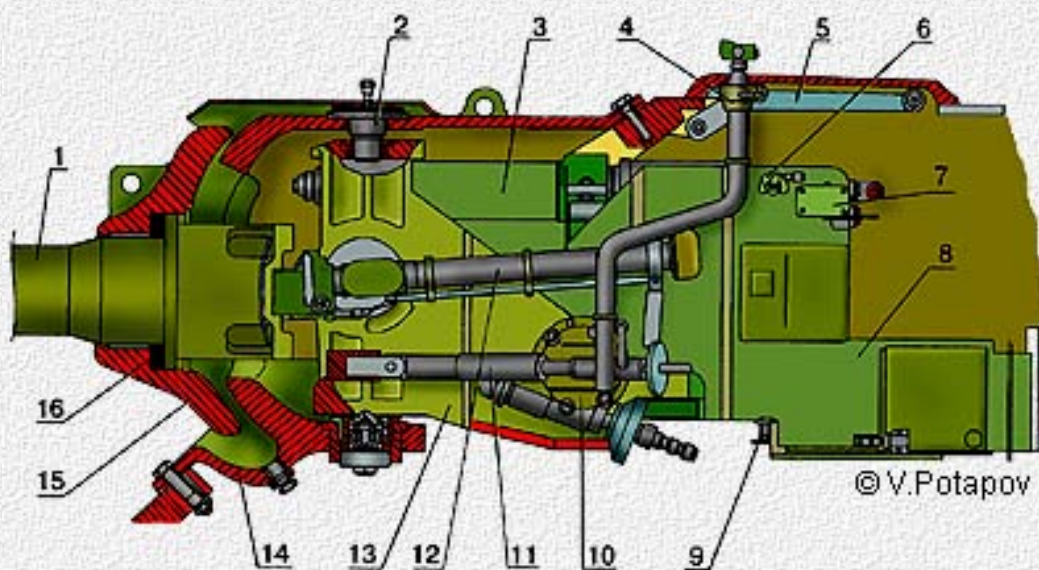
Ýòà ñòðàíè÷åà ìðèàääåæèð áàáñàéðó [Russian Battlefield](http://www.battlefield.ru/armaments/s31.html)



100MM TANK GUN D-10

◀ [MAIN MENU](#) [SOLDIERS AT](#)

[WAR](#) [DOCUMENTS](#) [BATTLES](#) [TANKS](#) [ARTILLERY](#) ▶



100 mm Tank Gun D-10

- | | |
|------------------------|-----------------------------------|
| 1. Barrel; | 9. Mechanical activation lever; |
| 2. Top bracket; | 10. Vertical movement adjuster; |
| 3. Recoil brake; | 11. Horizontal movement adjuster; |
| 4. Hertz panorama; | 12. Sight TSH-19; |
| 5. Cannon mount clamp; | 13. Frame; |
| 6. Sidemeasure; | 14. Frame body; |
| 7. Electroblocking; | 15. Gun mantlet; |
| 8. Separation; | 16. Shock-absorber. |

D-10 GUN SPECIFICATION

Parameter	Value
Calibre, mm	100
Bore length, clb	53,5
Weight of pendulous elements, kg	2257
Weight of recoil elements, kg	1538
Normal recoil length, mm	550
Max recoil length, mm	650
Ammunition	fixed
Ballistic	100mm naval gun

Note: All Russian terms and abbreviations marked as *red italic* are described in the [Glossary](#).

Although mounting 100mm guns on heavy tanks was very appealing, several things, including lack of necessary ammunition, hampered their mass implementation. First attempts to use a 100mm gun with ballistics of a Naval Gun B-34 for arming heavy tanks were made by TsAKB, designing two models during autumn of 1943. One of them was a re-bored for 100mm Gun ZIS-6 with a modified brass catcher and vertical aiming device, and the second one 100mm Tank Gun S-34. Judging by the *NKV* letter exchange, we can suppose that in September one of the models was field tested from the mount of a 152mm Howitzer ML-20. Results however are

Practical ROF, shot/min

5-6

ARMOR PENETRATION TABLE*

Projectile	Angle	Range, m			
		500	1,000	1,500	2,000
BR-412	60°	CP = 125	CP = 110	CP = 95	CP = 87
	90°	CP = 155	CP = 135	CP = 115	CP = 100

***Certified Penetration (CP)** means the 80% probability of armor penetration;

Muzzle velocity for the AP projectile - 880 m/s.



JS-4 with D-10T Main Gun at ChKZ Factory. 1944.

require any modification to the turret of the tank.

Tank with a 100mm Gun D-10T received the designation JS-4 (Object 245). First testing of the tank was unsuccessful like the JS-5, armed with an S-34 Gun. The same defects were noted, such as a weak gun cradle, badly sealed recoil brake and some more. The gun was returned for repairing, but the field officers more liked the tank fitted with an S-34, that alleviated the task of the gunners.

From July 1st to 6th 1944, on the Gorokhovetskiy proving grounds, tandem field testing of the D-10 **OKB** #9 and S-34 **TsAKB** guns mounted in tanks JS-4 and JS-5 continued. Now the reliability of the D-10 was noted, but the impressions were spoiled by the insufficient ammunition storage (30 shells), bad ventilation of the gunner module and strain on the loading gunner.

unknown, and so is the index of the weapon.

On December 27th, 1943 a decision came from **GKO** #4851 about the conversion of the [tank JS](#) and self-propelled artillery with a 100mm gun, modified with an easier to use loading mechanism. Obeying the decision, Test Factory #100 manufactured two JS tanks converted to a 100mm gun. Essentially, based on the **GKO** decision only the tank JS-100 was supposed to be armed with an S-34 Main Gun, but the mounting required modification of the internal module, which the tank factories didn't like. Because of that, in April of 1944 **OKB** #9 suggested its variant of the 100mm Gun D-10, whose mounting did not

Parallel to these tests, **OKB** #9 and the 520th Department of Factory #183 received an assignment to mount a 100mm gun in the turret of a [T-34](#). This decision was made due to the insufficient HE power of 85mm guns in battles against long-term fortifications. However, even the drafting of the project showed that the mounting and use of a 100mm gun on a T-34 would be hampered by the 1600mm diameter of the turret ring. Use of a JS turret with a turret ring diameter of 1850mm wasn't possible due to the need of manufacturing an absolutely new body, especially complicated by the T-34's "candle" suspension. Nonetheless, **OKB** #9 experimented with mounting a 100mm D-10 Gun in a standard turret, but the details of this project are unknown.

It should be noted that an armor-piercing shell for a 100mm gun was in production only in November of 1944, when it was found out that due to the significant degradation of armor on German tanks, the effectiveness of the 122mm guns mounted on the JS tanks significantly increased. Besides that, test shelling of the German Panthers on Kubinka **GABTU** proving grounds in September 1944 proved the [extreme effectiveness of 122mm shells against Panther's front armor](#). With the explosive shells, 122mm shell was superior to that of the 100mm, which is why GKO made a decision against the mount of D-10 in heavy tanks, which is indicated in [mail about the mounting of 100mm gun on the JS tanks](#).

Another attempt at up-gunning a T-34 to a 100mm gun was tied with the design of the [tank T-44V](#). By the initiative of A. Morozov, permitted by the Narkomtankprom (Minister of Tank Industry), for construction design of the T-44V turret, the 520th Department lead by Doroshenko designed a "mobile stand" from the body and devices of the T-34, where the new turret was mounted. This project received a factory index [T-34-100](#). In February-March of 1945, this tank was field tested with guns ZIS-100 and D-10 on the Sverdlovsk and Gorokhovo proving grounds. The testing was generally successful, but the accuracy of the shells wasn't good, and the recoil reaction on the suspension too great. Nonetheless the military personnel liked the vehicle that demanded continuation of work on it, with a possible goal of strengthening the armament of the T-34-85. However, all attempts to increase accuracy of the D-10 and minimize the recoil reaction failed. The T-34-100 project was abandoned, especially since at that moment the T-54 tests were conducted.

During 1945-47, the D-10 was mounted in experimental tanks T-44-100, whose 85mm armament was deemed insufficient, as well as various modifications of experimental T-54. As a result, the superiority of the D-10 above others was confirmed, since the gun didn't have a muzzle brake and was more compatible than others for arming a medium tank.

During the whole war the only BR-412 APHE projectile used, in 1946-1950th some improved projectiles were developed, for example BR-412D and BR-412B.

Usage

The D-10 Gun was used to equip the following war-time tanks and self-propelled artillery:

Production tanks: none.

Production SP-Guns: [SU-100](#).

Experimental tanks: T-34-100, T-44-100, KV-100, [JS-4 \(Object 245\)](#).

Experimental SP-Guns: [SU-101](#).

AMMUNITION FOR THE D-10 GUN*

SHELL		PROJECTILE					PROPELLANT CHARGE	
Index	Weight, kg	Index	Weight, kg	Length, clb	Weight of a charge, gram	Fuse	Index	Weight, kg
HIGH EXPLOSIVE, FRAGMENTATION								
UOF-412	30.2	OF-412	15.6	4.29	1.46	RGM, RGM-6, V-429	?	5.5
UOF-412U	30.2	OF-412G	15.6	4.29	1.46	RGM, RGM-6, V-429	?	2.4
UO-412	30.2	O-412 (naval)	15.94	4.29	1.46	KTM-1	?	2.4
ARMOR PIERCING								
UBR-412	30.1	BR-412B (APBC)	15.88	3.6	0.965	MD-8, DBR-2	?	5.5
UBR-412	30.1	BR-412 (APHE)	15.88	3.08	0.065	MD-8	?	5.5
UBR-412D	30.4	BR-412D (APCBC)	15.88	3.9	0.061	MD-8, DBR-2	?	5.5
ARMOR PIERCING SUB-CALIBER (HVAP)								
n/a								
SHAPED-CHARGE ANTI-TANK (HEAT)								
n/a								

CANISTER AND SHRAPNEL

n/a

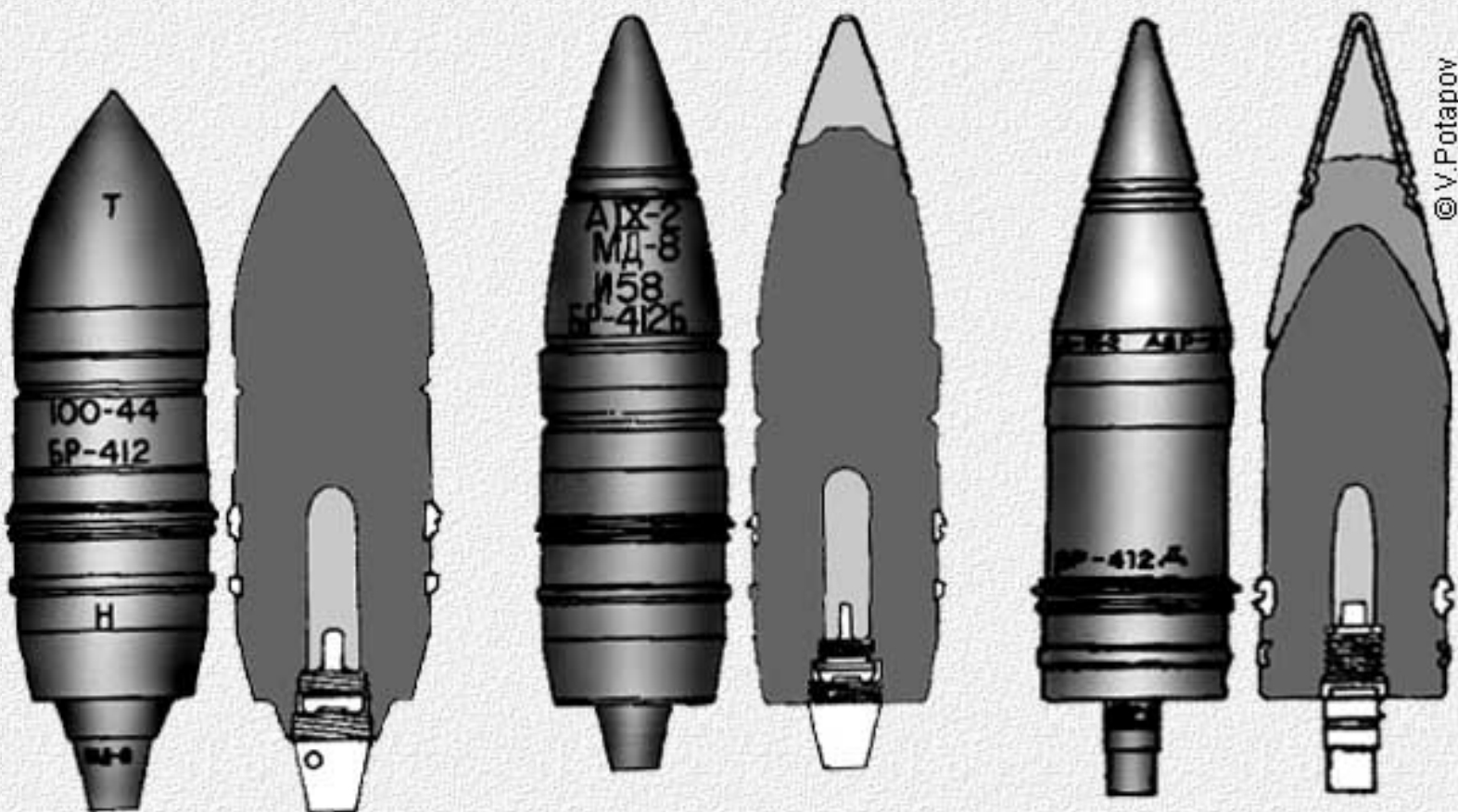
INCENDIARY

n/a

SMOKE

UD-412	30.1	D-412	16.68	3.08	-	RGM, RGM-6, V-429	?	5.5
UD-412U	30.1	D-412	16.68	3.08	-	V-429	?	5.5

***Note:** this table does not reflect some post-war projectiles.



Armor-Piercing Projectiles: BR-412, BR-412B, BR-412D.



High-Explosive Fragmentation Shell UOF-412

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Sources:

A.Shirokorad "Entsiklopediya Otechestvennoi Artillerii", 2000

[Entsiklopedia Vooruzhenii KiM](#)

"Artillerijskoye Vooruzhevie Sovetskikh Tankov 1940-1945" Armada-Vertical, #4, 1999

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The T-60 Light Tank

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The T-60 light tank of the 2nd Battalion of the 3rd Guards Tank Brigade. Kalinin Front. 1942. (M.Dmitriev)

Development history

In May 1941, Moscow Factory #37 received an order to manufacture the new T-50 light tank, which was designed in Leningrad by factory #174. This tank had features that suited mass production, namely, small dimensions and low metal requirements (total weight was only 14.5 tones). It was envisaged that it would be manufactured in large numbers of small factories and industrial sub-stations that originally could not manufacture 'serious' vehicles like the [T-34](#) or [KV](#). This would utilize those production facilities that weren't yet involved in tank manufacturing. Simultaneously, factory #37 was ordered to develop and manufacture a complex and labor-intensive new 6-cylinder diesel engine, the V-4.



The T-60 light tank.

This order was met with scepticism among the factory's engineers and workers since the modest capabilities of the factory didn't match the task. Highlighting just one of the obstacles, the manufacturing of cogwheels was difficult for the factory and the T-50 had a very complex 8-speed planetary gearbox. However, at this time, the war was proving that maneuverable lightly-armored vehicles like the T-50, with their light armament, were urgently needed by the Red Army (for

reconnaissance or convoy duties particularly). The catastrophic situation faced by the Red Army in the summer and autumn of 1941 also gave urgency to this project.

The increased production of the [T-40](#) light tank, and the move to make them non-amphibious and better-protected, led the engineers of factory #37 to the conclusion that there was a need to develop a new light tank for close infantry support. At the time, each Soviet rifle division was supposed to have (according to TO&E) one light tank company with 16 tanks.

In developing the new tank, engineers used some parts from the existing T-40 tank, including the transmission, the chassis, and the engine. The hull of the new tank had a rationalized silhouette, with reduced dimensions but increased armor protection. The whole project was accomplished in only 15 days (in August 1941) and was headed by N.A. Astrov. Within this very short time, the paper project of the "060" light tank was completed, and its scale-model was built.



Technical examination of just produced tanks.

However, Astrov, together with Lt. Colonel V.P. Okunev, wrote a letter to Josef Stalin where they had detailed the impossibility of manufacturing the T-50 in Factory #37. Alternatively, they offered their project "060" which could have been put into large-scale production immediately. Stalin read the letter, and the next morning V.A. Malyshev, who was the Chairman of the Council of Ministers, visited Astrov and Okunev.

Malyshev examined the new vehicle, discussed some technical problems and aspects, and offered to replace the initially projected 12.7 mm heavy machine-gun with the much more powerful 20 mm ShVAK automatic gun that was already manufactured and used widely in aviation applications. Astrov agreed, and Malyshev connected him with OKB-15 (which was the designer of the ShVAK gun) and ordered it to develop a tank version of their gun. By the evening of that day, the new light tank was accepted for service, and a special order to manufacture 10,000 of those tanks was issued. This tank was designated the T-60 (some documents call it T-60Sh, where "Sh" means ShVAK). Initially this order was assigned to five factories:

- the Factory #37 in Moscow;
- the Factory #176 (Gorkovskiy Avtomobil'niy Zavod) in Nizhnij Novgorod;
- the Factory KPZ (Kolomenskiy Parovozostroitel'niy Zavod) in Kolomna;
- the Factory #264 (Krasnoarmeiskiy Sudostroitel'niy Zavod) in Stalingrad;
- the Factory KhTZ (Kharkovskiy Traktorniy Zavod) in Kharkov.



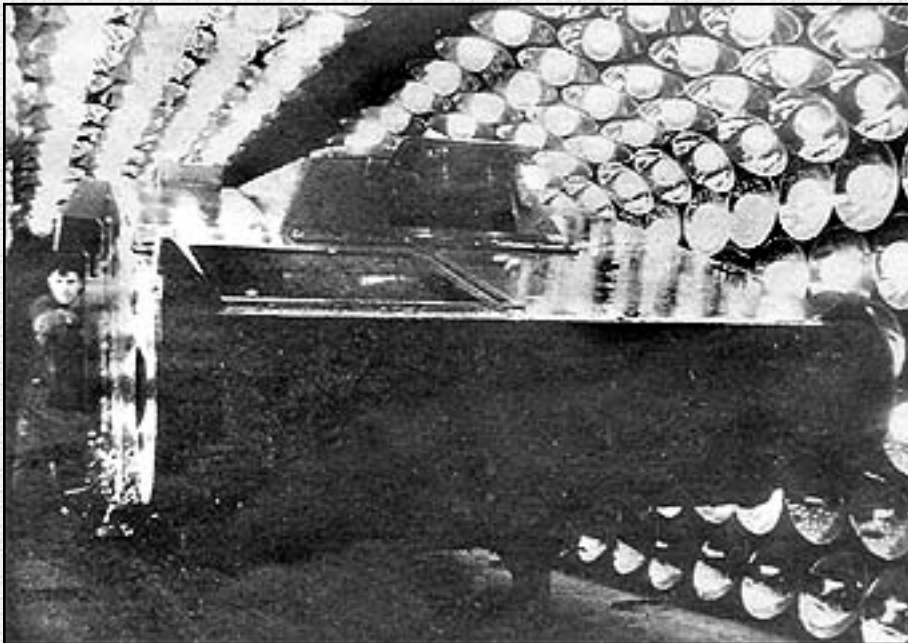
The T-60 light tank. (M.Petrovsky)

Soon, the KhTZ was evacuated, so it was excluded from the list. Later, another two factories were involved:

- the Factory #38 in Kirov;
- the Factory #37 in Sverdlovsk.

Three additional factories were also assigned the manufacture of various pieces of the T-60:

- the Factory KIM in Moscow;
- the Factory "Krasniy Proletariy" in Moscow;
- the Factory #592 in Mytishy.



Baking the just painted T-60.



The T-60 had a new welded hull designed by A.V. Bogachev. This hull was more rigid, with a low silhouette (1360 mm) and well-sloped armor made of rolled homogeneous armor plates (steel grade 2P). Small dimensions allowed an increase of the front armor thickness to 15-20 mm initially, and later up to 20-35 mm. The side armor was increased to 15 mm (later to 25 mm), and the rear armor was increased up to 13 mm (later to 25 mm). The driver's hatch thickness was 10 mm (later 13 mm). An emergency hatch was placed at the bottom of the tank. The overall capacity of the two internal fuel tanks was 320 litres.

U.P. Udovich designed the new eight-sided conical turret. It was much cheaper to produce compared to the turret of the T-40. Protection was provided by 25 mm armor plates welded together. The thickness of the gun mantlet was increased to 35 mm. It is important to note that the KPZ factory

**The tank column before sending to front.
Kirov. 1942.**

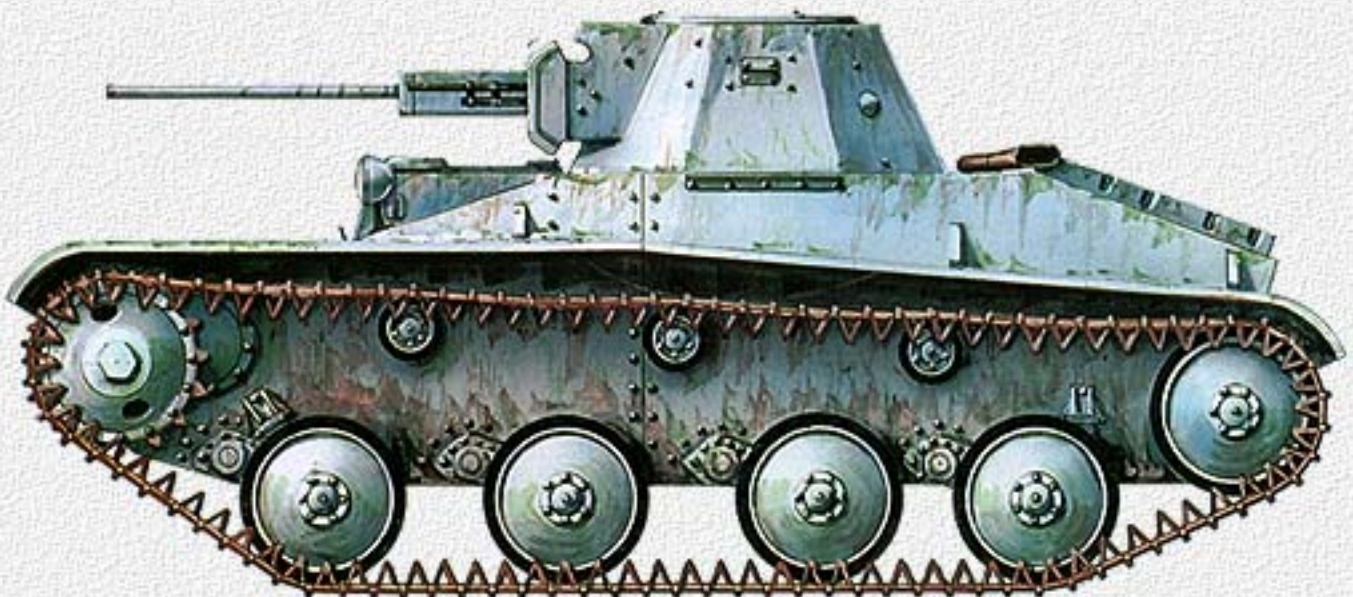
manufactured tanks with rounded conical turrets like on the T-40.

On the second T-60 prototype, the DShK machine-gun was replaced with a 20 mm 'ShVAK-tankovaya' gun (L/82.4). This gun was based on the ShAK-20 aircraft gun. Testing of the new gun was conducted at the same time as the first trials of the T-60. This gun was therefore only officially accepted for service on December 1, 1941. From January 1, 1942, this gun received the designation TNSh-1 (later this gun was re-designated TNSh-20).

Ammunition consisted of fragmentation tracer rounds, fragmentation incendiary rounds, and armor-piercing rounds with carbide-tungsten cores. Later, sub-calibre armor-piercing incendiary rounds became available, so the armor penetration increased to 35 mm on 60° sloped armor from 500 metres. This allowed the T-60 to successfully combat early German Pz-III's and Pz-IV's as well as German APCs and other lightly-armored targets.

The T-60 was also armed with a coaxial 7.62 mm DT tank machine-gun. The mounting of this machine-gun allowed its use as a light machine-gun outside the tank. It could be quickly dismounted, and was equipped with a shoulder butt and spade grips. Situations where this occurred were quite common. If needed, the TNSh could also be quickly dismounted as its weight was only 68 kg. The closest German counterpart for the T-60 was the Pz-II and the "Lynx". The T-60 was slightly better-protected, and had a longer range and better mobility on rough terrain, while its German counterparts enjoyed better reliability and were radio-equipped.

The first T-60s had spiked road wheels, sometimes without rubber tyres. Later, all rubber tyres were removed because of the scarcity of rubber. Road wheels and idlers were made to become interchangeable. The first production tanks did not have radios. Internal communication was performed either by TPU-2 or by signal lamps.



The T-60 Light Tank. Stalingrad Front. Winter 1942-1943. *(M.Dmitriev)*



Military parade in Moscow. November 7, 1942.



Training of the Soviet infantry. Western Front. 1942.



The T-60 light tank. Leningrad Front. 1942.

(M.Dmitriev)

After up-armoring, the weight of the T-60 increased from 5800 to 6400 kg, but due to use of the same engine, the specific power decreased and speed suffered as a result. To increase mobility on swampy and snowy terrain, special removable track extensions for increasing the track width were developed which could be fitted over the standard tracks. The large-scale production of these track extensions was set up from 1942. Compared to other Soviet tanks, the T-60 had the best mobility on snowy and swampy terrain, on water-logged meadows, and in muddy conditions.

For the Red Army, the importance of this tank was so great that Stalin himself attended the trials of the second prototype (this prototype was armed with the TNSh). After that, all factories to be involved in the manufacturing the T-60 began preparations with frantic haste. Additionally, the Moscow automobile factory ZIS became involved in production of this tank.

A Soviet engineering team headed by Chief Engineers B.M. Fitterman and A.M. Avenarius designed a new version of the T-60. It was named the ZIS-60. It was

distinguished from the original tank by a new turret, slightly redesigned hull, and a new

automobile engine, the ZIS-16 (88 h.p.). This engine was much heavier than the GAZ-202, but was satisfactory. At least ten ZIS-60 tanks were manufactured.

Because of the lack of GAZ-202 engines, in October 1941 Malyshev issued an order to use any engine that could be installed. Among others, there were some T-60s equipped with Ford V-8 engines. As a last resort, it was possible to install the GAZ-M engine, though it was underpowered for the T-60.

To further increase the output of the GAZ factory, some modifications to the engine were made. These changes were managed by A.A. Lipgart (Chief Engineer of GAZ) and A.M. Kriger (Chief of the Chassis and Engine Department). Initially these engines were designated "030", later they received the "060" designation.

Meanwhile, on September 15, 1941, the first production T-60 was manufactured at factory #37. However, this factory was evacuated soon after (by an order issued on October 9, 1941), and the industrial process was cancelled on September 26. Only 245 tanks were manufactured.

Factory #37 was evacuated to Sverdlovsk in three places: to the Metallist factory; to the Voevodin's railway-carriage repair works; and to a branch of the Uralmash factory. Together with the elements of the KIM factory, they founded the new tank factory #37 (the Chief Engineer was G.S. Surenyan, later N.A. Popov). The new factory opened on December 15, 1941. The first 20 T-30 and T-60 tanks were tested on the new proving grounds, then through Sverdlovsk, to be sent to the front. Over the next three months, the factory manufactured 512 tanks.

In February 1942, factory #37 and its design bureau developed, manufactured, and tested the modified T-60, which was named the T-60-1 (some sources name it "060" or T-60-ZIS). It was powered by the ZIS-60 engine (95 h.p., later 110 h.p.). This engine was put in full-scale production in the Miassky Automobile Engine Factory that was situated nearby.

By September 1942, 1144 T-60 tanks were manufactured. After that, the factory was switched to manufacturing the T-70 light tank. The largest factory that was producing T-60 tanks was GAZ, in which N.A. Astrov had arrived together with a small group of engineers. Soon he became the Deputy Chief Engineer of the factory, and in the beginning of 1942 he was awarded the Stalin's

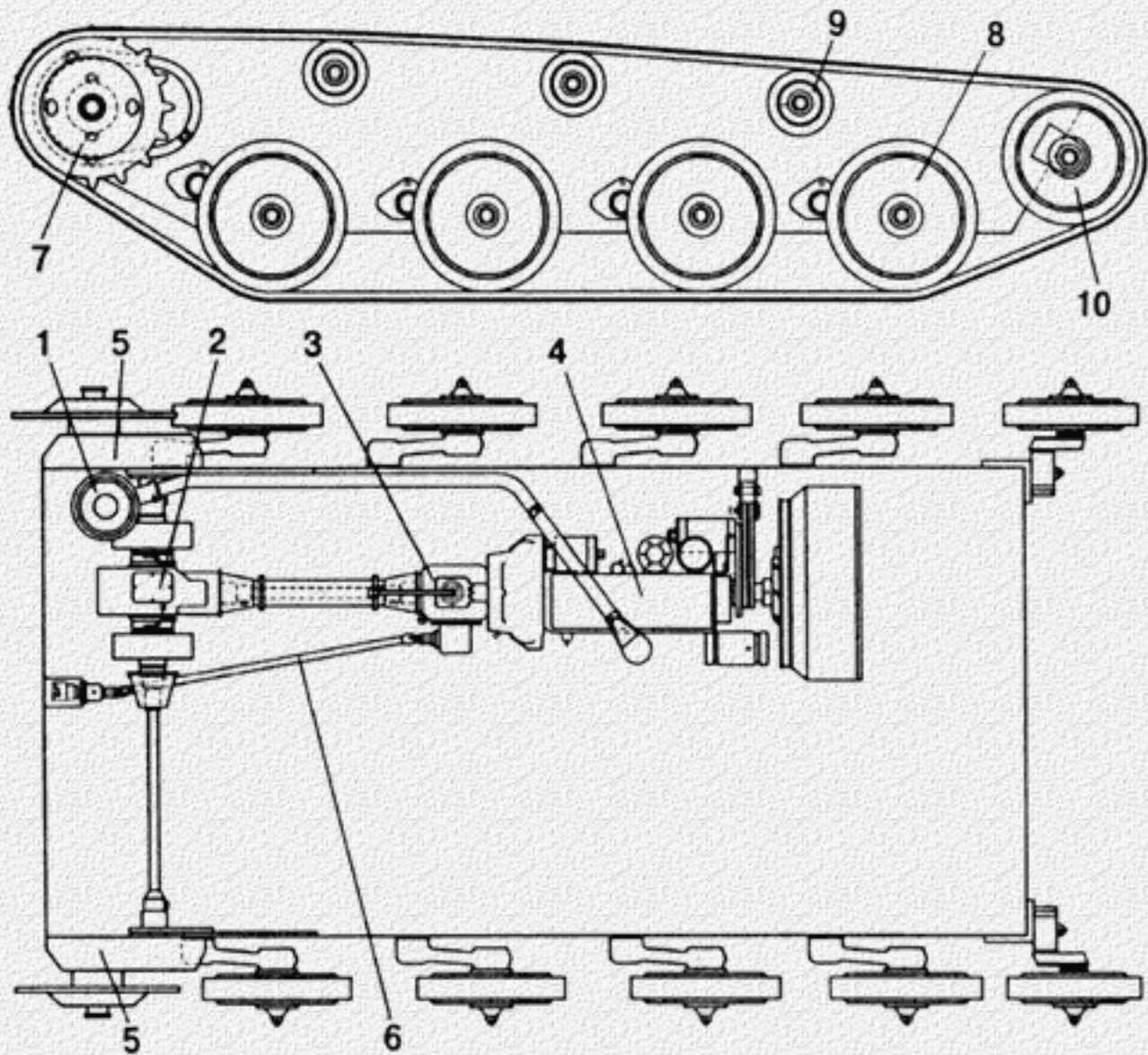


The meeting. The regiment of Colonel Gatchenko. South-Western Front. 1942.

Prize for development of the T-40 and the T-60 tanks.

Very quickly, this factory finished all required technological preparations and from October 26 started the mass production of the T-60. The hulls were supplied by factory #177 in Vyksunsky; later they were supplied by factory #176 in Murom as well as by factory #178 in Kulebaki and factory #180 in Podolsk. At times there were shortages of tank hulls, thus the manufacturing of T-60s

became sporadic. To solve this problem, a whole GAZ workshop was switched to production of hulls for the T-60. It is worth noting that the hulls of different factories had minor differences that didn't affect the characteristics of the whole tank.



The chassis of the T-60:

- | | |
|--------------------|-----------------------|
| 1. The air filter; | 6. The starting axle; |
| 2. The main gear; | 7. The driving wheel; |
| 3. The gearbox; | 8. The road wheel; |
| 4. The engine; | 9. The support wheel; |
| 5. The side gear; | 10. The idler. |



The T-60 armed with the 37 mm Tank Gun ZIS-19 mounted in the new turret. (M.Pavlov)



The T-60-2 tank armed with ZIS-19BM gun. (M.Svirin)

To increase the firepower of the T-60, and in particular its armor penetration, there was a plan to rearm the T-60 with the 23 mm VYa automatic gun that was far superior to the TNSh-20.

Unfortunately, the large recoil force could jam the turret. After a few attempts, the plan was cancelled, and the T-60 wasn't rearmed with the VYa.

Besides the VYa gun, there were other several attempts to rearm the T-60. Two attempts stand out, and the first of these attempts was undertaken at the beginning 1942 to rearm T-60 with the 37 mm ZIS-19 automatic tank gun. The gun was developed in August 1941 by design bureau #92 led by V.Grabin. Although the gun was intended for universal use, it was ultimately planned for use in light tanks.

The gun was very powerful, and the muzzle velocity of the armor-piercing shell was 915 m/s. The gun was too big to be installed in the standard turret, so a new turret was designed. The T-60 with the new turret and the 37 mm gun passed all trials but wasn't accepted for service because of a major shortage of 37 mm ammunition.

The second notable attempt to rearm the T-60 was made in March and April of 1942. The 45 mm ZIS-19BM tank gun was chosen. This gun was also developed by design bureau #92. Compared with the ZIS-19, the new gun had some significant advantages: most of its elements were similar to the existing 45 mm 20K tank gun, but most importantly, there was no problem with procuring 45 mm ammunition since it was already manufactured by several factories.

On April 5, 1942, the factory trials began. After that, the gun was sent to factory #37, which was developing the T-45 light tank. Because the ZIS-19BM was too big to be installed into the standard T-60 turret, the gun was installed into the T-45's turret. The T-60 with the new turret and armed with the 45 mm ZIS-19BM was sent to the factory

trials.

This T-45/T-60 hybrid was named T-60-2 or simply "062". The gun was placed to the right of the turret's center. This layout was very handy to load the gun, and consequently the rate of fire was significantly increased.

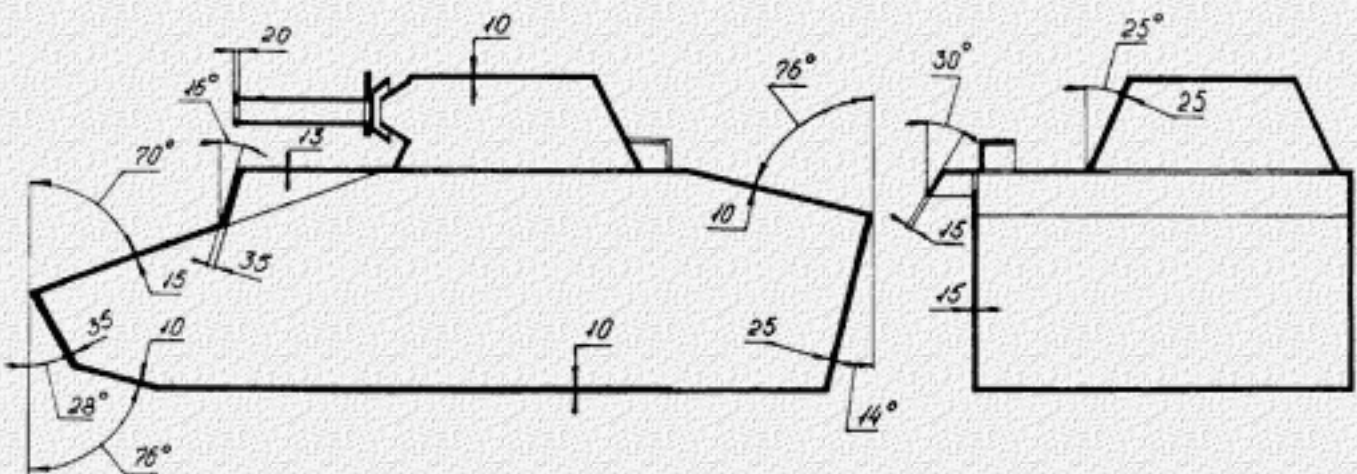


The T-60 in Kubinka. (Photo by V. Potapov)

Unfortunately, by that time, the newest T-70 Light Tank was tested and accepted for service, so the attempts of modernisation of the T-60, the T-45, and the ZIS-19BM were considered as "having no prospects" and further work was cancelled.

To protect the T-60 from Molotov cocktails (which the Germans used beginning in the winter of 1941-1942) there was a plan to mount a special wire-mesh shield. In February 1942, near Chkalov, trials of the T-60 fitted with these shields were carried out. The trials were successful, but unfortunately such shields were rarely used due to the additional expense involved.

In 1942, in spite of the successful development of the T-70, the production of the T-60 continued concurrently up to August 1942. In 1942, the total output of the T-60 was 4164 tanks. In February 1943, the last batch of 55 tanks was sent to the front, after which the T-60 was removed from production.



REFERENCES:

[The T-60 in action](#)

[Modifications of the T-60](#)

[Blueprint of the T-60](#)

[Specification of Soviet tanks](#)

[Specifications of Soviet tank guns](#)

Proof-reader:

[Mark Jaremco](#)

Sources:

"Transmission and chassis of the T-60", Voenizdat 1942

"The T-60 tank. Operational manual", Voenizdat 1942

"Technical guide of the T-60", Voenizdat 1944.

"Bronekollektsiya", #4 1997

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The T-60 Light Tank

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The T-60 in Action

The first verified battle involving the T-60 light tank occurred at the end of September 1941, while serving in the 10th Tank Brigade they were involved in intense battles near the Poltava region.



The T-60 on the trainings. 1942. (A.Ivanov)

Large numbers of this tank fought in the Battle for Moscow (1941-42). Those tanks fought in almost tank brigade and battalion strength. On November 7, 1941, 48 T-60's took part in the Red Square military parade. Just after the parade, the tanks were sent to front. Many of those tanks were built in Moscow factories. Tanks of the Gorkij Factory (GAZ) first

appeared on the Eastern Front on December 13, 1941. The role of the T-60 in the Battle for Moscow was very important because the overall Soviet tank production of that time was extremely low as most Soviet industry was being evacuated.

Only the STZ and KTZ factories were operational, though KTZ in Leningrad was already encircled by German forces, thus in effect, only STZ remained. However, STZ itself didn't produce tanks, it only assembled tanks from already manufactured parts. Those hulls, turrets, and chassis elements were supplied by other factories which were already being evacuated and were not operational.



Loading the 20 mm ammunition. Leningradsky Front. 1943. (RGAKFD)

By the beginning of spring of 1942, 60 T-60 tanks were sent to the Leningrad Front to form the 61st Tank Brigade. It is interesting to note that since Leningrad was encircled by the Germans, it was important to hide delivery of those tanks, and therefore tanks were put on coal barges and well-camouflaged with coal.

Those barges often delivered coal to Leningrad, and the Germans didn't pay them proper attention and allowed them to pass unharmed, and all the tanks were delivered successfully in this manner.

On January 12, 1943 (the first day of the Soviet offensive which broke the Leningrad encirclement), the 61st Tank Brigade together with the 86th and 118th Tank Battalions were engaged in battles as elements of the 67th Army. Tank units of medium and heavy tanks crossed over the ice of the Neva river a day later, after Soviet infantry supported by light tanks and sappers had strengthened the ice for safe tank crossings.

Tanks of the 61st Tank Brigade successfully met with units of Volkhovsky Front, and after that operation, the 61st Brigade received the "Guards" status and renamed the 30th Guards Tank Brigade.

There were several successful attempts to increase the frontal armor of the T-60. Additional 10 mm armor plates were placed on the glacis of the hull and around the turret.

T-60's were used on the Southern Front, especially in the spring of 1942 in the Crimea. These tanks were used in the Kharkov operation as well as during the Stalingrad

operation. The Germans called the T-60 the "ineradicable locust."



A knocked out T-60. Leningradsky Front. 1943. (RGAKFD)

T-60 tanks were the core of the 1st Tank Corps (commander - Major-General M. E. Katukov). In the summer of 1942, this corps, as an element of the Bryansk Front, was engaged in defensive battles near Voronezh. The 1st Tank Corps and the 16th Tank Corps were combined as a single unit. After the heavy battles, this unit was in a desperate situation. Katukov relates in his memoirs:



The T-60 tank of the 30th Guards Tank Brigade, Leningradsky Front. 1943. (pic. M.Dmitriev)



Repairing a tank in field conditions. (RGAKFD)



The T-60 with pressed roadwheels. (RGAKFD)

"The Germans attacked us continuously. They tried to find a weak point in our defense. After several attempts they found it, and German infantry was able to make a breakthrough through our first lines of defense where we didn't have proper artillery coverage. It was a precarious situation, because the Germans continued their attacks to cut off and destroy our forces.

The German forces attacked along the whole front line, thus there weren't any available reserves. I had only two T-60 light tanks in operational reserve, but whom could stop these "armored miniatures" with their 20 mm guns?

They were useless against German tanks, but they could be used successfully against enemy infantry and usually caused heavy losses among them. This happened at both Mtzensk and Moscow.

And now, in this fateful hour, when the Germans had

almost defeated us, those "ridiculous" tanks saved our positions. It was lucky that the rye in the area was 1.5 metres tall, as the T-60's were almost hidden by it. Using this rye field, both of our T-60 tanks were able to infiltrate to the rear of the German infantry and then opened fire. After several minutes of intensive fire, the German attack was halted."



The T-60 with the uparmored turret. The 3rd Guards Tank Brigade, Kalinin Front. 1942.

(RGAKFD)



Before the battle. Stalingrad area. 1942.

(RGAKFD)

In September 1942, during the rugged defense at Stalingrad, the 91st Tank Brigade was engaged in action having T-60 tanks in its service. Many of those little "baby" tanks had impressive nicknames like "Grozniy" (Terrible), "Orel" (Eagle), "Smelij" (Brave), etc.

The Stalingrad battle and the run on the Leningrad blockade became the apogee for T-60 light tank. From the end of 1942, the usage of these tanks decreased. They served well and completed their tasks but they couldn't withstand modern German tanks and the increasing demands placed upon them. The use and production of the T-60 was on the decline.

Soviet tankers didn't love the T-60 because of its weak armament and too light armor. Tankers called them BM-2 which meant "Bratskaya Mogila na dvoikh" (a brother's grave for two).

Breaking the encirclement around Leningrad (January 1944) was the last large operation where the T-60s took part. For example, among



the 88 tanks of the 1st Tank Brigade there were 21 T-60's, and 18 T-60's were in the 220th Tank Brigade. At the same time, the 124th Tank Regiment (attached to the Volkhov Front) possessed only ten tanks: a pair of T-34's, a pair of T-70's, five T-60's and one T-40 (still alive! unlikely, but true!).

After that operation, T-60's were used only as convoy vehicles, in

T-60s ready for anti-aircraft firing. The South-Western Front. 1942. (A.Ivanov)

signal units, for reconnaissance, and as artillery tractors for ZIS-2 antitank and ZIS-3 field guns. They were also used as commanders' tanks. In that capacity, T-60's were used until the end of the war.

Besides the Red Army, three T-60's served in the Voisko Polskoe (Polish Army) in 1945. Many T-60's were captured by the Germans and Finns. The Germans usually used them as armored tractors, and occasionally they removed their turrets. Some of those tanks were given to Rumania. The Rumanians used them to build a batch of quite successful self-propelled guns "Takam," armed with the ex-Soviet 76.2 mm F-22 (the predecessor for the ZIS-3 Field Gun) installed in a non-rotating compartment open at the top and rear.

The hull and the chassis of T-60 satisfied the Rumanians and were left almost unchanged. Moreover, some sources indicate the Rumanians built two other self-propelled guns armed with a 105 mm howitzer.

After the war, all surviving T-60's were quickly removed from service. Today, the last "pure" T-60 is displayed in the tank museum in Kubinka.

REFERENCES:

[Development history](#)

[Modifications of the T-60](#)

[Blueprint of the T-60](#)

[Specification of Soviet tanks](#)

[Specifications of Soviet tank guns](#)

Proof-reader:

[Mark Jaremco](#)

Sources:

"The T-60 tank. Operational manual", Voenizdat 1942;

Technical guide of T-60", Voenizdat 1944;

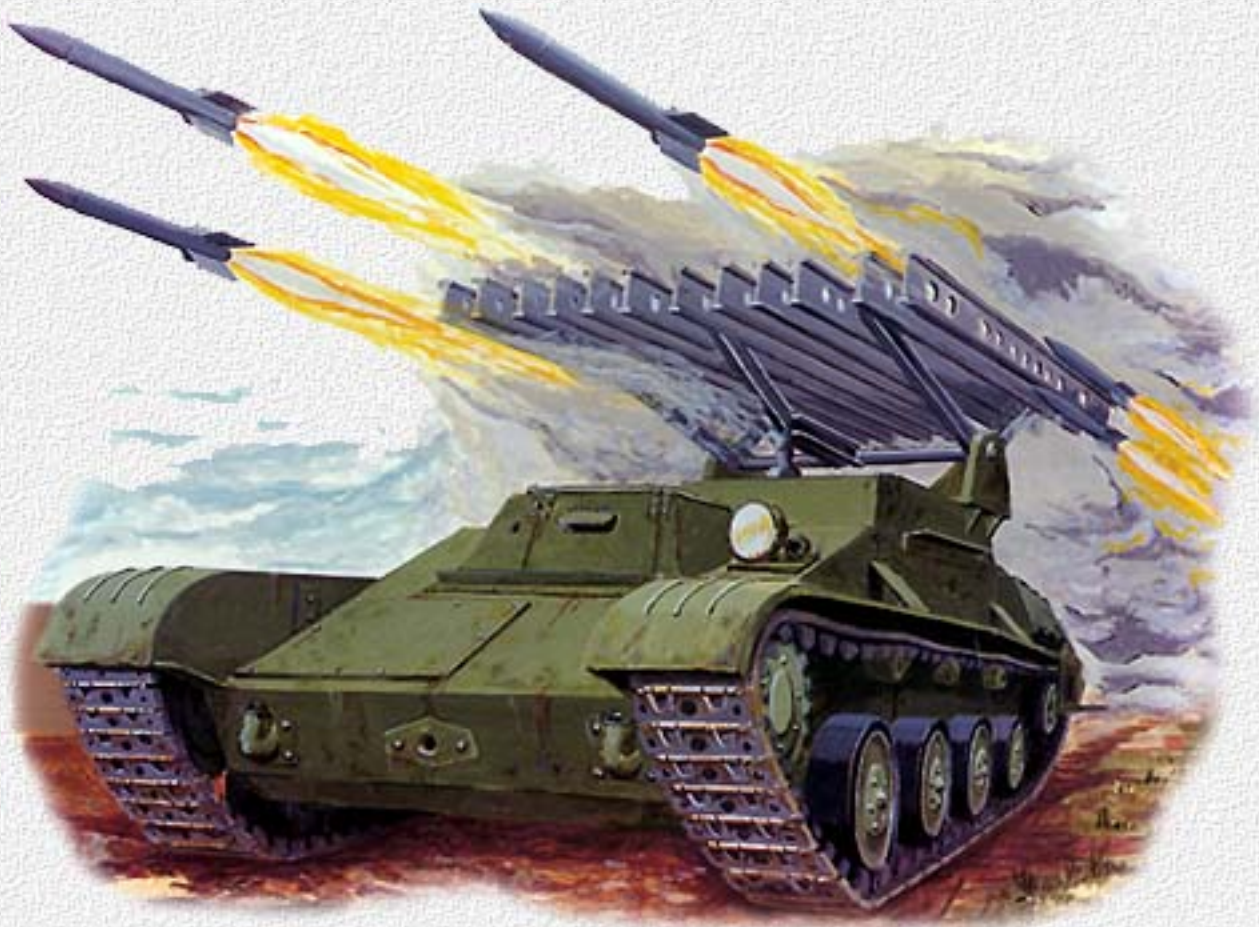
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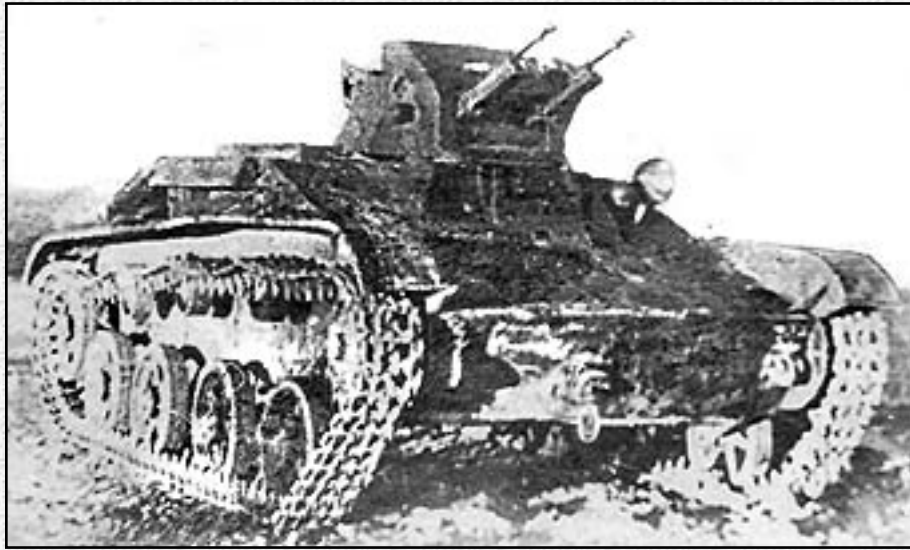
The T-60 Light Tank

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The BM-8-24 rocket launcher

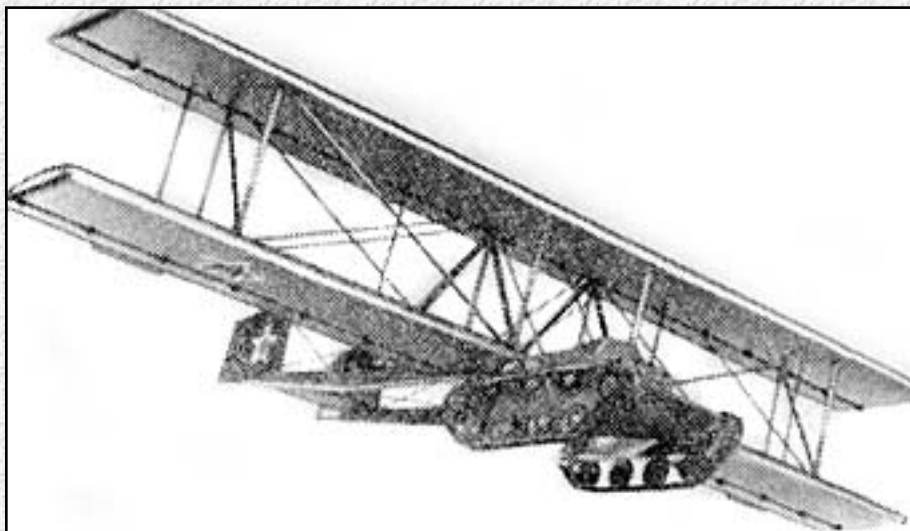
Modifications of the T-60



The experimental T-60-3 tank.



The Rumanian SP gun based on T-60.



The KT tank in flight.

The T-60 was an excellent base for many experimental projects. An armored self-propelled anti-aircraft vehicle was needed to protect tank units and staff vehicles, and at the end of 1942 a new tank was developed and manufactured at the GAZ Factory. That tank was named "063" or T-60-3 (the "3" meaning third modification). Some post-war sources also claim the tank had the "T-90" designation, although I didn't see this designation in archival documents.

This tank had the hull, the chassis, and the engine taken from the production T-60, but the tank had a new turret with double 12.7 mm DShK anti-aircraft machine-guns installed. Because of some technological troubles, GAZ was unable to manufacture the turret's traversing mechanism with proper precision (which is required for anti-aircraft combat). This was the main reason why the "063" wasn't accepted for service.

The BM-8-24 multiple rocket launchers were based on chassis of T-60 tanks as well as on T-40's. They were accepted for service in October 1941. In autumn 1941, Soviet engineer O.K. Antonov offered to develop a simplified glider with a hull taken from the production T-60.

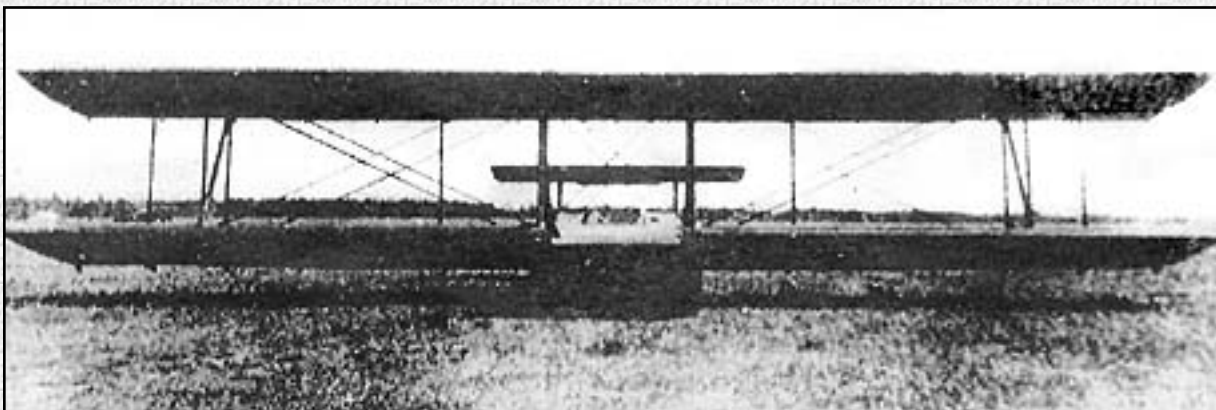
The glider was intended for transport by the four-engined TB-3 bomber or by the twin-engined DB-3F bomber. After

landing, this vehicle had to drop its wings and empennage (tail) and thus, be ready for immediate combat.

Antonov's project was supported by General S.A. Afonin (Director of the General Tank Directorate), and at the end of 1941, Antonov's Design Bureau received an official order to develop this vehicle. The project was completed in only three weeks and by the summer of 1942, the very first experimental tank was manufactured in the glider factory in Tiumen. This tank received the "KT" index which meant "Kryl'ya tanka" (Tank's Wings). Please notice, that "Krylatyj Tank" (Winged Tank) is a wrong name, but still in use by some sources. Several other sources use the designations "A-T", "AT-1" or "glider A-40."

The wingspan of the KT was 18 metres, and the length was 12.06 metres. The tail was managed by a driver through special hawsers. The tank was lightened (weight decreased to 5800 kg!) by removing armament, ammunition, headlights, and was left only a very limited amount of fuel. The final flight weight of the KT was 7804 kg. A test flight was performed in the autumn of 1942. The KT was transported by the TB-3 bomber. S. Nanokhin was the driver of the KT, and he reported that idea of the flying tank was quite realistic and could be successful. However, because of the poor aerodynamics of the KT, the transportation of the tank was a huge strain on the TB-3, its engines overheated, and to avoid crashing, the KT was ditched in an emergency.

However, the KT glided very smoothly and successfully landed on a rough field near the Ramenskij Airfield. After landing, the wings and tail were dropped, and it successfully returned to its base at Monino. But because of a lack of sufficiently powerful airplanes, further work on the KT were cancelled and never resumed.



The KT tank with removed turret. 1942.

REFERENCES:

[Development history](#)

[The T-60 in action](#)

[Blueprint of the T-60](#)

[Specification of Soviet tanks](#)

[Specifications of Soviet tank guns](#)

Proof-reader:

[Mark Jaremco](#)

Sources:

V.Shavrov "The history of the airplanes construction";

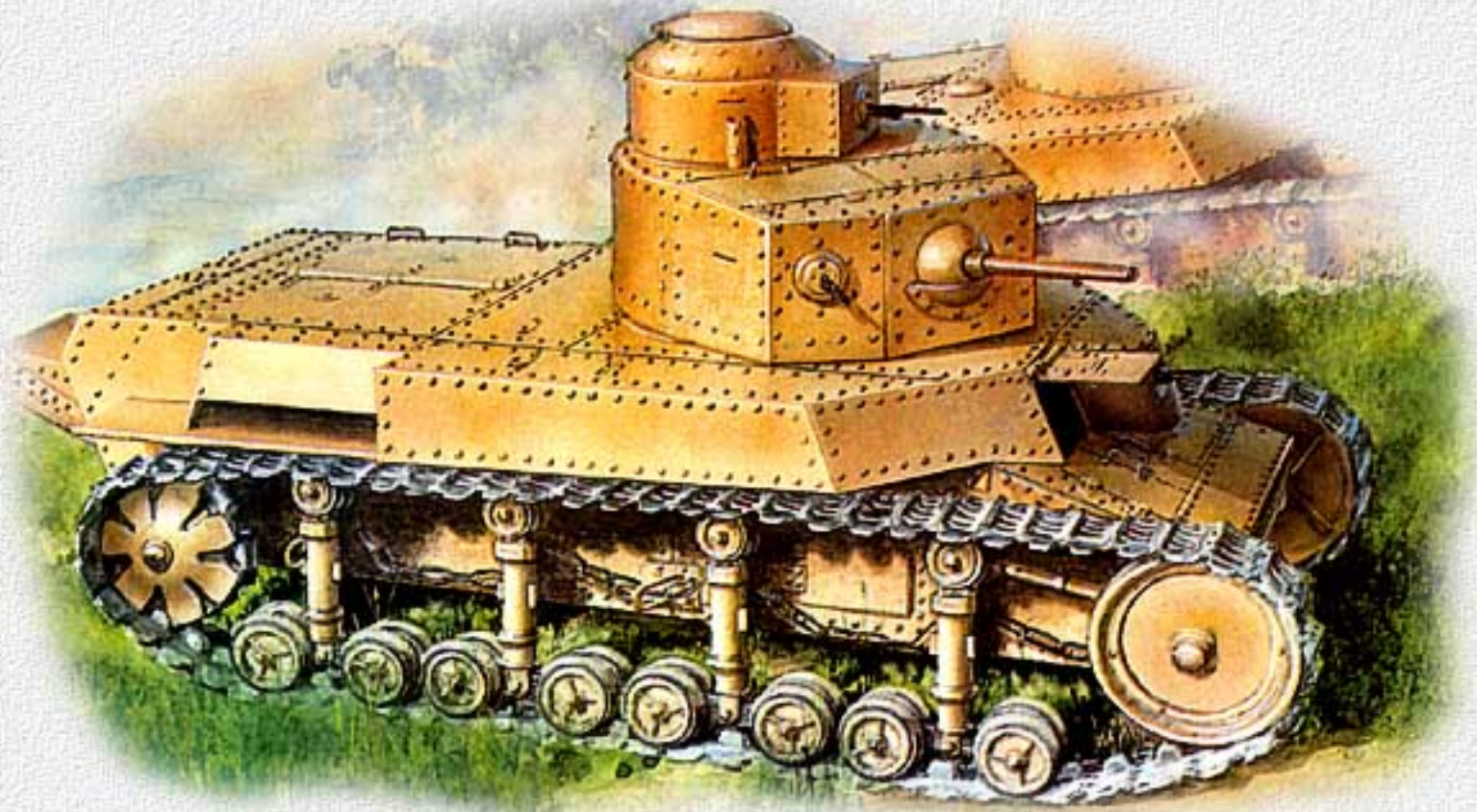
"Bronekollektsiya", #4 1997

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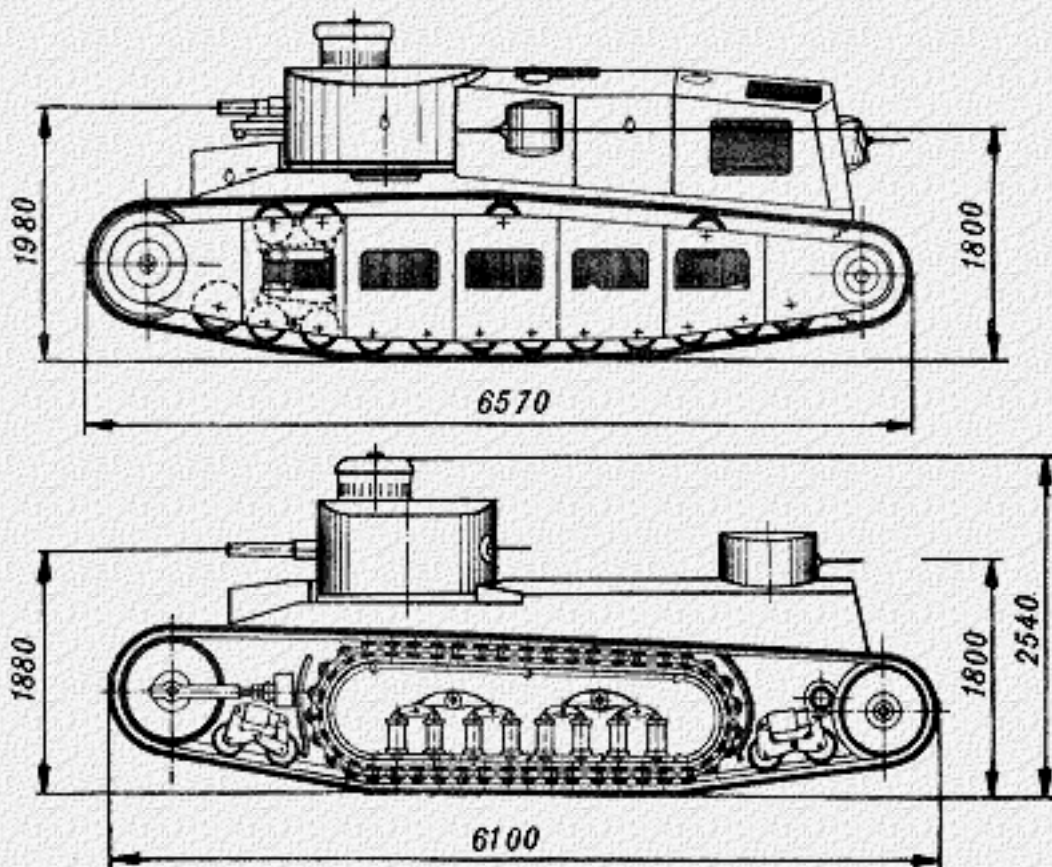
The T-24 Medium Tank

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Note: All Russian terms and abbreviations marked as *red italic* are described in the [Glossary](#).

In course of the Russian Civil War deployment of tanks in comparison to armored trains had very limited extent. Despite this the "Centrobron", an organization specially formed by Soviet Government, from the very beginning gave full attention to fighting tracked vehicles, expecting their major role in the future.



Paper projects of very first Soviet tanks. (GUPP)

Conditions of open competition for the design of a tank for Red Army were published in the journal "Izvestiya Narodnogo Kommisariata po Voennym Dyelam" on November 2nd, 1919 (News of the People's Commissariat of Military Affairs). The first prize was given to 10-ton amphibious tank under designation "Motor vessel type AM", designed by G.V. Kondratiev. Production of two units started at Izhorskiy Factory, though they were not completed.

Contrary to the modifications of French tank "Renault FT17/18" produced by Sormovo Factory, Kondratiev's tank was completely new design. The second competition in 1922 brought 7 more designs. It turns out that tank designing was very prolific despite that the country's economy was not ready for experimental tank production.

In 1923 **GUPP VSNH** took a task to systematize expertise in designing the tanks. A year later within **OAT** the Moscow Tank Bureau was set up with S.P. Shukalov as a head. Among various designs produced were 10-ton tank GUPP-1 and 16-ton tank GUPP-2. The first one bore resemblance of armored train platform with a turret at the end set on tracks. Rear and mid parts formed a casemate, preventing fire rearwards since it was assumed that during break through the enemy defenses the targets worthy a 3-inch shell will be in front or at the flanks. The whole area around the tank was covered by fire from six machine-guns. The tank had 13-mm thick armor, crew of 6, and according to estimates the top speed should be 20 km/h. Configuration of the GUPP-2 was inspired by the French tank 2C, however 45-mm cannon in the front turret could cover almost full field around the tank, except small area at the back due to location of the rear machine gun turret. New suspension was designed, to allow for top speed of 20 km/h. Tank was to be fitted with four machine-guns, 22-mm thick armor and crew of 5.

However army required new equipment for the armed forces immediately. At that time



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the Red Army possessed some obsolete and heavily worn-out French and British captured tanks. By April 1925 situation with armament of tanks became critical as well. For example, only 10% of all Ricardo (Mk.V) tanks were supplied with 57-mm Hotchkiss gun (other 90% were unarmed); all Renault FT-17 which must be armed with cannons in fact were unarmed. As temporary measure fitting Maxim machine-guns was proposed.

On October 24th, 1925 a meeting on tank production and arrangement of the tank design works was held in the Mobilization and Planning Directorate of the Red Army. As a conclusion it was decided to put on hold design of "big" or "positional" tank (means heavy tank) and allocate all resources to design "maneuverable" or "small" tank. The latter one, under designation T-16 passed general trials and on May 6th, 1927, by the decision of the **RVS** of



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The T-12 tank during trials at Kharkov. June 1930.
(M.Kolomiets)

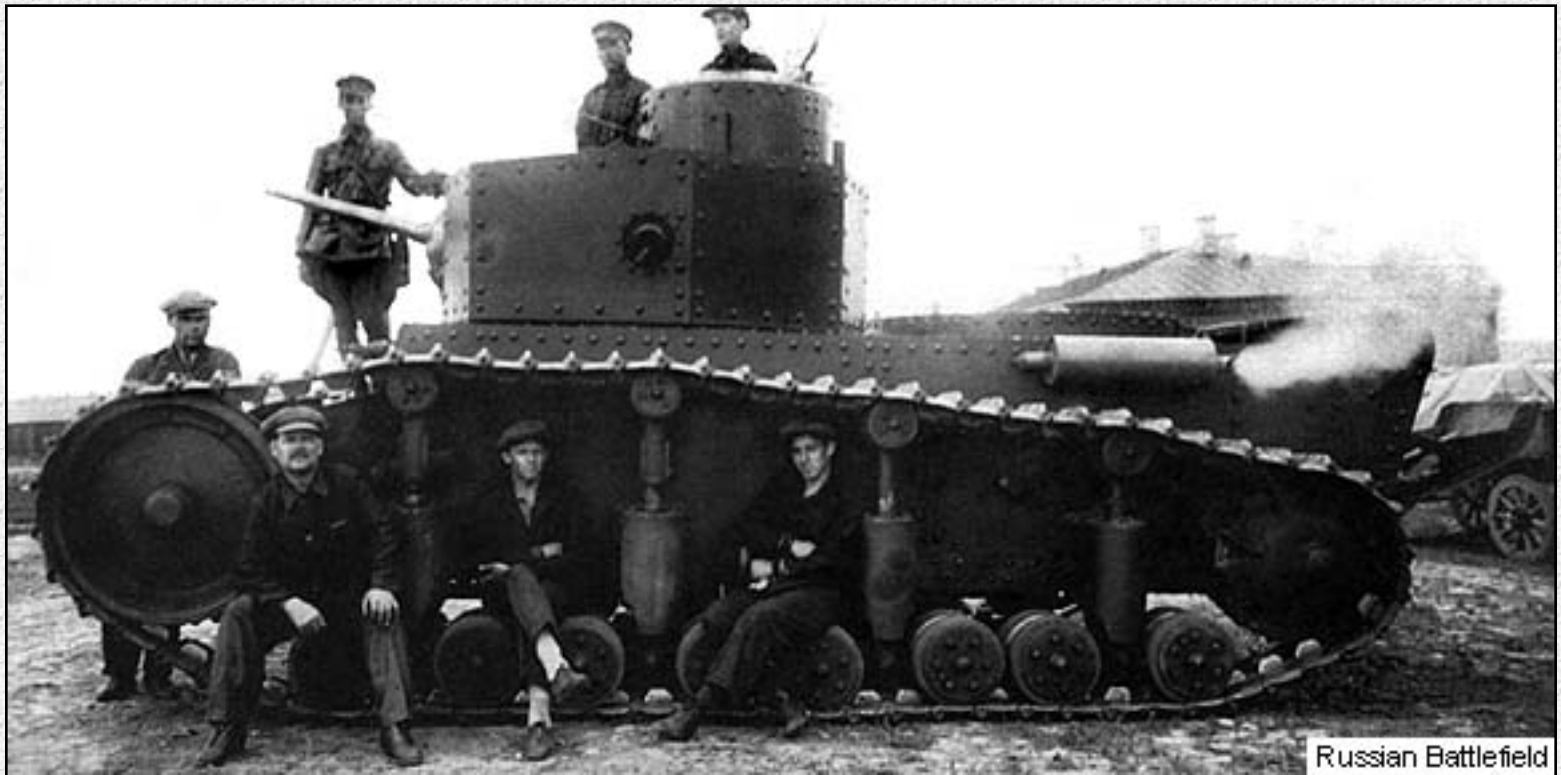
USSR was accepted for service for the armed forces and since then was known as T-18 (MS-1).

The task of design and manufacture of maneuverable tank was awarded to **OAT** on November 17th, 1927, on the condition that during manufacturing of the tank in **KhPZ**, the **OAT** will provide technical assistance.

The tank design bureau at the **KhPZ** factory was set up in October 1926, but it did not have expertise in designing tanks as the factory had only manufactured steam engines and "Communar" tractors in the past. Therefore, the design work was divided between **KhPZ** and **OAT**: The transmission and the traction were designed in Kharkov, the hull and the turret were designed in Moscow. The **OAT** was not enthusiastic about designing the T-12 (the designation awarded to the manoeuvrable tank) and succeeded in transferring part of its work to the Kharkov designers. For more than six months, they worked in Moscow under the direction of **OAT** Chief Designer S. Shukalov and Lead Designer O. Ivanov. Among other things, they designed the turret, the hull, the crew positions, the armament mounts, and the vision arrangements. Engineer N.M. Toskin, a representative of **OAT**, took part in the design of the T-12 in Kharkov. From October 1928, 23-year old draftsman Alexander Morozov joined the design team. Later he became a director of the tank design bureau at **KhPZ**, became an outstanding designer, and became twice a Hero of Socialist Work.

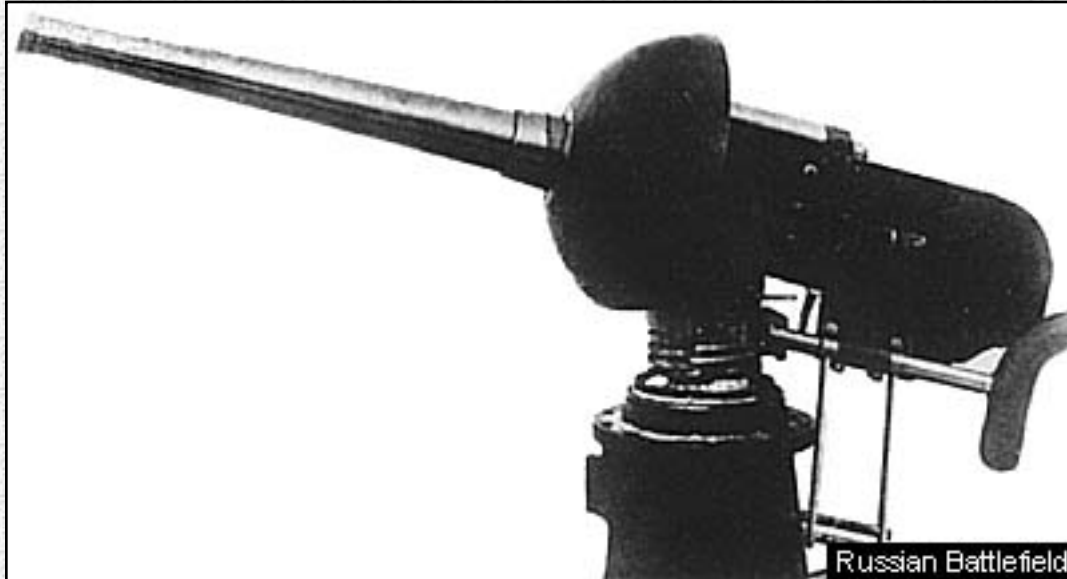
The T-12 was the result of combining expertise gained during the design of the T-18 tank and the concept of a multi-level layout of armament recently employed by the Americans in their experimental T.1.E1 tank (1921-1925). Originally, the T-12 was to be equipped with a 45-mm long-barrelled cannon or a 57-mm howitzer, and three Fedorov twin machine-gun mountings. All armament was located in two levels in the turrets; a main turret, and an independently-rotating small turret with machine guns. A serious shortcoming of this concept was that the movement of the main turret seriously affected the control of the smaller one. The multi-turret design also resulted in an overall height of three meters, which gave a high profile and which made camouflaging difficult.

The empty weight of the tank was 14,280 kg. While combat ready, with the crew of four, the ammunition (100 shells for the main gun and 4,000 rounds for the machine-guns), and the fuel, etc., the ground pressure was 0.45 kg/cm². It was planned to use an eight-cylinder aviation Hispano engine with 200 h.p. at 1500 r.p.m., with an option to replace it by a purposely-made engine with 180 h.p. at 1800 r.p.m. In the engine compartment, a track-tensioning device was housed.



The T-12 tank during trials at Kharkov.

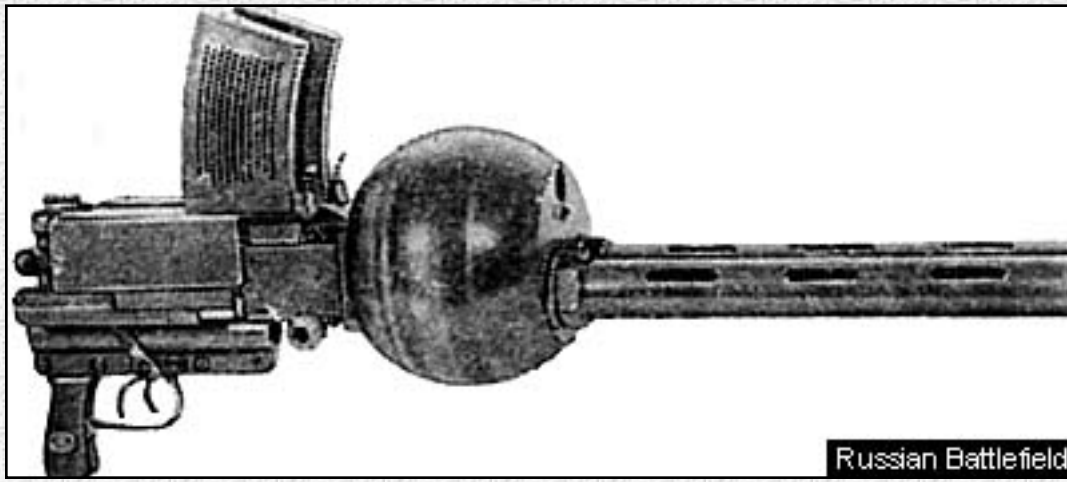
**The vehicle is armed with a 45-mm main gun Model 1930 and three machine-guns
DT. June 1930. *(M.Kolomiets)***



The 45-mm main gun Model 1930

An unusual feature of the T-12 was the location of the driver, which was to the left from the longitudinal axis of the tank, and which differed from other Soviet tanks. The top speed was 26 km/h, and with an epicyclic gear mechanism, it could be converted to 15 km/h, 7 km/h and 2.7 km/h with reverse drive at all speeds. A new feature was a floating brake designed by professor V.I. Zaslavskyi.

The vertical armor plates



The 6.5-mm coupled machine-gun Fedorov-Ivanov Model 1925

were 22-mm thick, while the horizontal armor plates were 12-mm thick. The main turret was mechanically operated, while the small machine-gun turret was traversed by means of a back support.

The T-12, as its predecessor the T-18, had a rear extension

fitted, increasing its total length to 6.90 metres which allowed the tank to cross trenches up to 2.65 metres wide. The maximum ascent angle was 40°.

On July 11, 1930, Commisar Voroshilov, the head of **UMM** Khalepskiy and the head of the **UMM** Technical Department Bokis, observed the tank's field trials. The tank passed the trials successfully. A speed of 26 km/h was easily attained on hard ground, and two-metre-wide trenches were crossed. During the trials, a Colt machine-gun was fitted in a Shpagin ball mounting as the Soviet-made DT machine-gun was not yet ready for the trials.

Good fire concentration was noted as 60% hits on target were recorded. A number of faults were listed as well: the tracks easily slipped off; after 20 gear changes, the speed decreased; after 90 litres of petrol were consumed, the fuel flow stopped despite the fact that there were still 130 litres left in the cells. Nevertheless, the overall assessment was positive, the tank fulfilled the requirements, and it was recommended to be used by the army after the problems had been rectified.

At the same time, the 22-mm and 18-mm armor plates were subjected to artillery fire and they proved sufficiently resistant. The plant Chief Engineer C.N. Makhonin and the design bureau head I. N. Aleksenko, signed the trial certificates. Following their recommendations, the design bureau of the GKhPZ factory implemented the changes and the modified machine received the new T-24 designation. The main reason behind the significant changes was the insufficient range of the tank.



The T-24 medium tank (front and rear view). 1940.

(M.Kolomiets)

Previous to this, on March 27, 1930, during a meeting of the **UMM** of the RKKA, the decision was made to manufacture a series of fifteen T-24s. The first three tanks were ready by the end of July 1930, and one of them was sent for comparative trials with the T-12.

The first day of trials on July 24, 1930, was uneventful, and the tank's performance was similar to the T-12. Three days of trials were planned for the 45-mm Sokolov Cannon which was mounted in a turret taken from a T-12 tank, but an extraordinary incident occurred. On July 26, while the tank carrying the cannon with ten shells was driving on soft ground, the engine set on fire. The report of this incident sent to Commissar Voroshilov states:

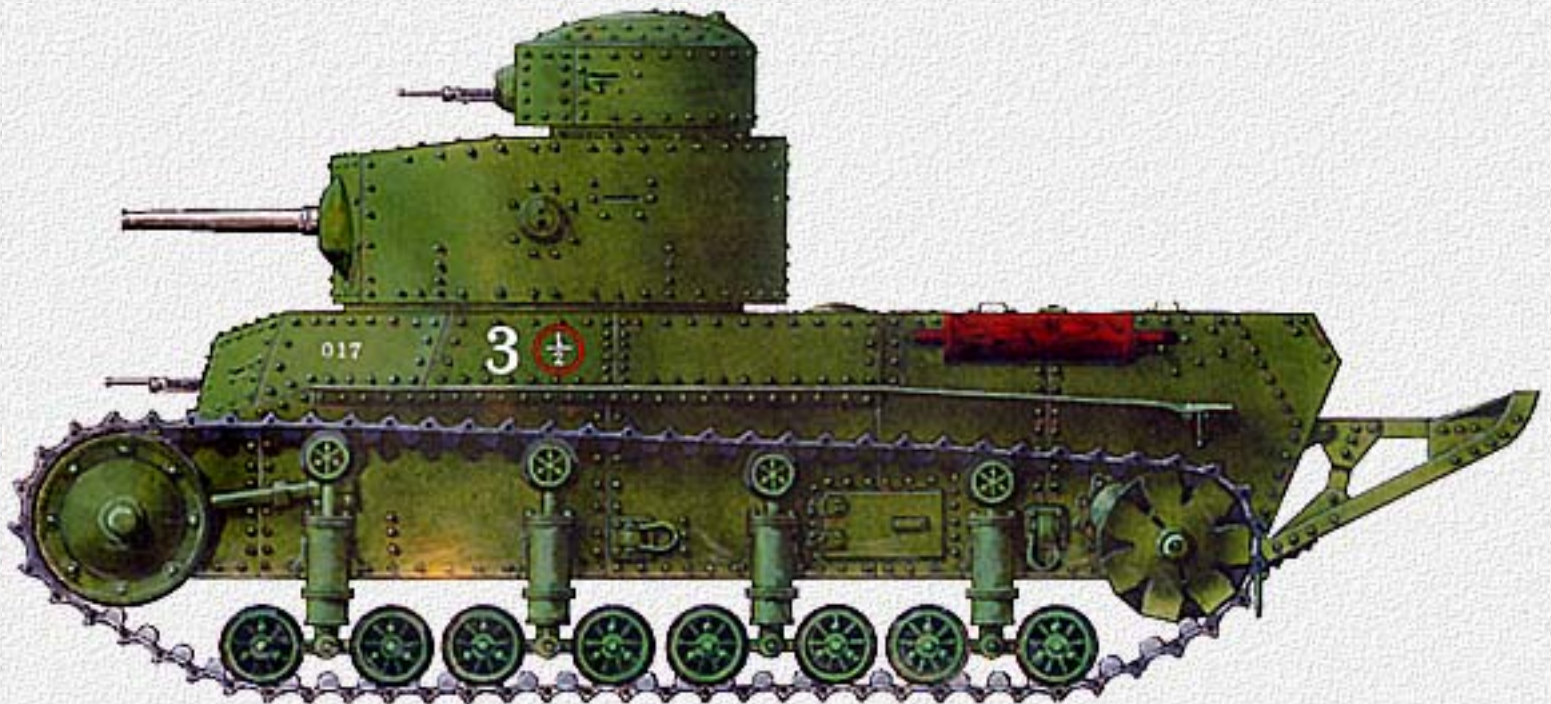
"Comrade

Vladimirov stopped the tank, helped the crew to abandon the tank, opened the engine compartment, extinguished 75% of the flames with the tank's fire extinguisher, then put on a gas mask, returned to the engine compartment and put out the fire using

sand and personal clothing."

The tank was saved, but it had to be repaired before further trials could proceed. The turret was transferred back to the T-12. The 45-mm Sokolov Cannon, fitted in the tank in 1930 as a temporary measure (until the introduction of the 45-mm semi-automatic **GUVP** Tank Cannon Model 1925 approved in the Artillery Committee Journal #693 from 18.06.26), turned out to be unsuitable for tanks and was not produced, and it is believed that only two of the cannons were manufactured. Readying the production line for the 45-mm OAT Cannon in Factory #8 took another two years. Peter Syatchintov eliminated the 57-mm howitzer's shortcomings, but the howitzer was not ordered for production, and some of its details were incorporated into the 76.2mm PS-3 Cannon.

The combat weight of the T-24 was 24.5 tonnes. The tank had 20mm-thick vertical armor and 8.5mm-thick horizontal armor, which provided protection against heavy machine-gun fire at all distances. The main turret was cylindrical, and at the top of the smaller turret, there was a covered hatch. The Soviet-made 300 h.p. M6 aviation engine was fitted. The transmission compartment was similar to the one in the "Komintern" artillery tractor. The transmission unit included a main friction clutch, a epicyclic gearbox, a double universal joint for reverse running and two side gears. The transmission unit was manufactured to a very high standard.



The T-24 on the maneuvers of the Kharkov Military District. 1933. (A.Aksenov)

The **KhPZ** and **ChTZ** factories were chosen to produce the T-24 tanks. It was planned to manufacture 200 tanks from 1930 to 1931, but as it was common to increase production

targets in those days, the target was increased to 300. The actual production numbers were much lower: 28 chassis, 25 hulls, 26 turrets, and 24 complete tanks were completed and accepted for service. Why so few? The tank obviously suffered from a series of faults, preventing it from being mass-produced, though the main reason was different. Numerous shortcomings did not stop the T-18, the T-26, and other tanks from being manufactured in large numbers.

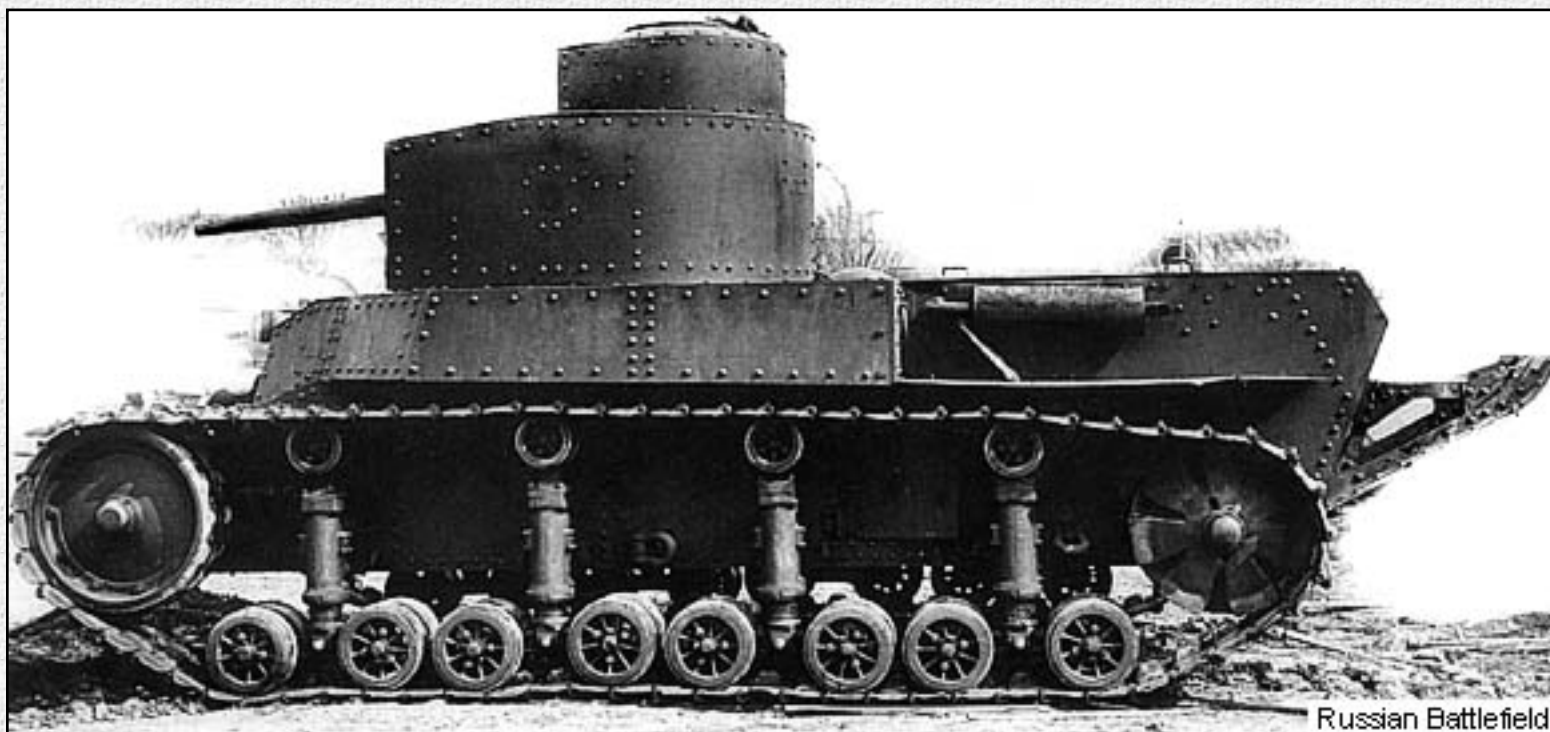


The T-24 on trials. July 18, 1931. (M.Kolomiets)

In RGVA archives, there is correspondence (from November 1930 to February 1932) between Khalepskiy, Zaslavskiy and Voroshilov, which indicates that the Head of the **UMM** was impressed by the "Grote tank," as Khalepskiy called the experimental middleweight tank designed by German engineer E. Grote. He praised it, pointing out that it had better

armament, drivability, steering ability, appearance and simplicity of manufacture in comparison not only with the T-12/T-24 but also with tanks "designed by an American, Mr. Christie, which I saw in the United States last year." Comrade Zaslavskiy, responsible for manufacturing the T-24, complained to Voroshilov that little attention was being paid towards production. Comrade Voroshilov advised Zaslavskiy to use his own resources and asked Khalepskiy: *"when will the new and badly needed [Grote] tanks join Red Army units?"* It went on for one year, while the manufacturing plant waited for materials and financing, the top brass were waiting for the completion of the trials of the Grote Tank, and were waiting to review the results. In the end, the Grote tank was not manufactured and the production capacity of the **KhPZ** Factory was allocated for manufacturing the [Christie tank](#), but production of the Christie tank was soon ended by Khalepskiy.

The 45-mm cannon for the T-24 was ready in 1932. Before this, the tank was armed with machine-guns only (the BT tanks, manufactured in the **KhPZ** Factory beginning in 1931, were armed only with machine-guns as well). In the Red Army, the T-24s were used originally as support tanks, but were shortly relegated to training duties. They did not participate in any military conflicts.



Production tank T-24 at NIIBT Poligon proving ground.

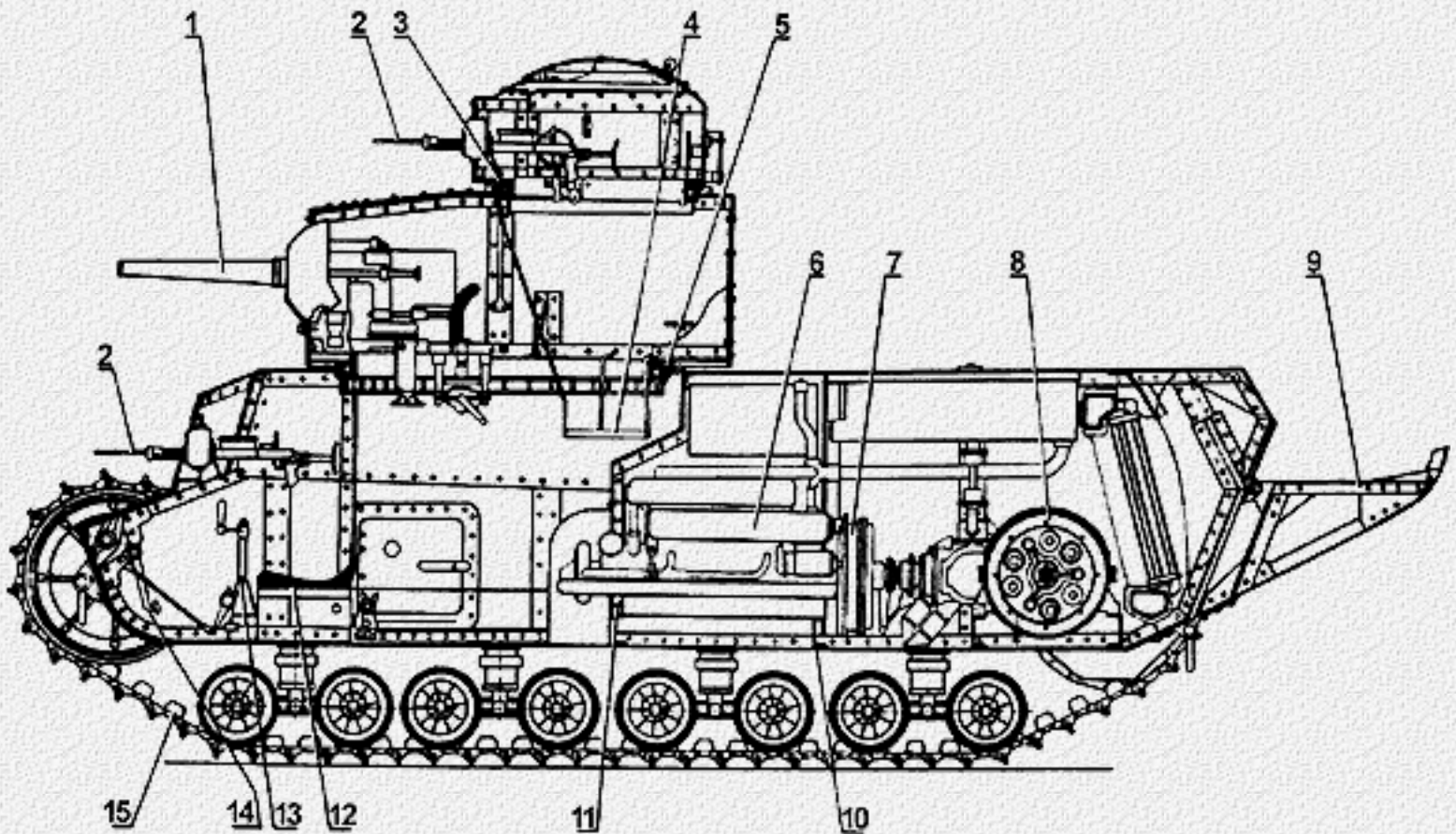
In the late twenties and the early thirties, when the Soviet tank industry was just emerging, new concepts were created, cadres were formed, and a whole range of tank models from the tankette T-17 to the middleweight Grote tank were produced. Among these, there was the T-24, the first Soviet-made medium tank. The new models helped in determining optimal relations between armor, armament, speed, maneuverability, etc. Many transmission systems, suspensions, and various types of tracks were tested, and different types of armament and mountings were tried out. Literally everything was done for the first time. Obviously, at that stage, to come up with a perfect design was difficult, and to achieve it quickly was impossible. The first Soviet tanks suffered from problems related to the power and transmission units, to slipping tracks, to traction, and to steering. The only early tank manufactured in quantity was the T-18, and it was popular with the crews.

The T-24 tank was taken off the production line as technical shortcomings and maintenance problems became evident. Nevertheless, it played a significant role in the history of the national tank industry. The early designs, the first tanks, and their manufacture brought experience that was vital to the creation of a strong Soviet tank industry.



The dismal end of the T-24: it was disarmed and used for artillery trials. *(M.Kolomiets)*

Interior Layout of the T-24



1. The 45-mm main gun;
2. The 7,62-mm machine-gun DT;
3. The ball-bearing turret race for small turret;
4. Sliding floor for the small turret;
5. The ball-bearing turret race for big turret;
6. The M-6 engine;
7. The main friction clutch;
8. The differential gear coupled with a belt brakes;

9. The tail;
10. The engine sub-frame;
11. The engine compartment' partition;
12. The driver's station;
13. The steering column;
14. The steering pedals;
15. The track.

REFERENCES:

[The T-12 blueprint](#)

[The T-24 blueprint](#)

[Specification of Soviet tanks](#)

[Specifications of Soviet tank guns](#)

Translated by:

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Sources:

M.Pavlov, I.pavlov, I.Zheltoy "Sovetskie Tanki Dovoennogo Perioda" Armada-Vertical #7, 2000;

"Tankomaster" #1, 2001;

"Modelist-Konstruktor" #9, 1989

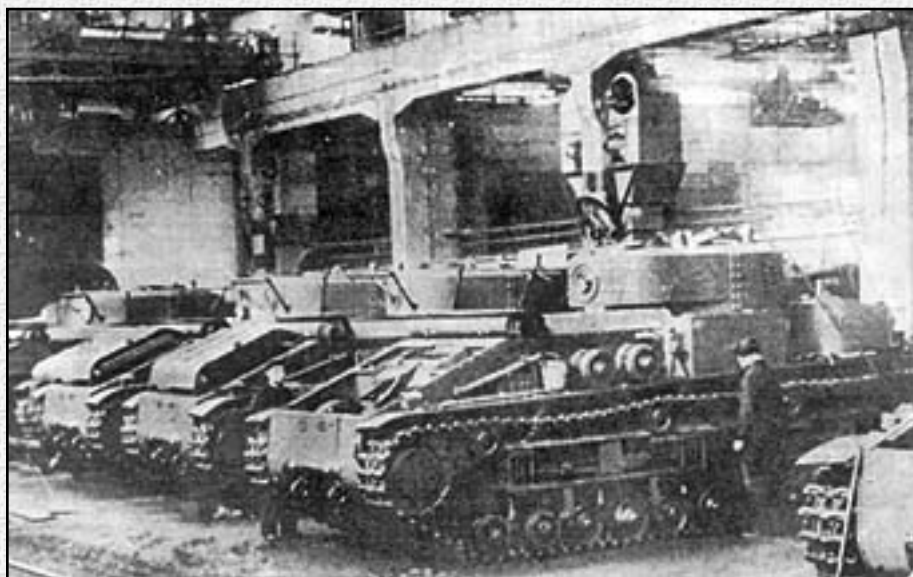
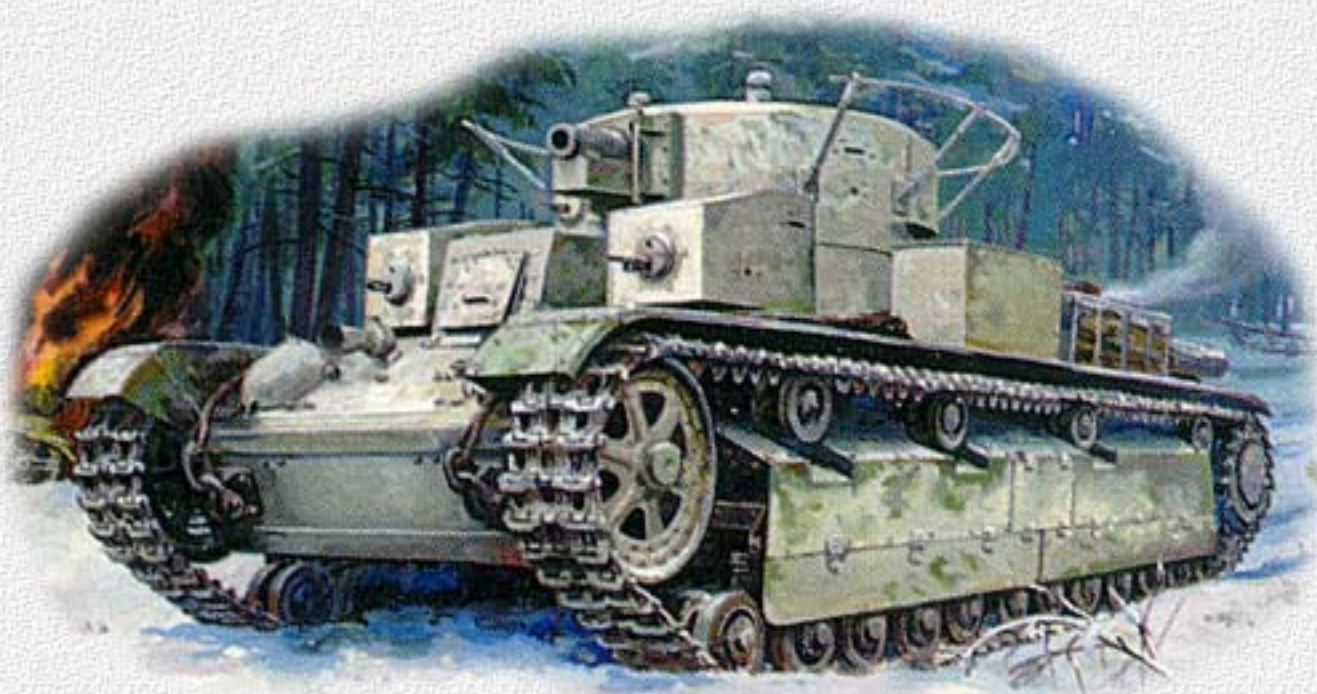
M.Svirin, A.Beskurnikov "Pervye Sovietskie Tanki", Armada #1

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The T-28 Medium Tank

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Manufacture of the T-28 tanks.

Before the Great Patriotic War, the T-28 multi-turret medium tank was a symbol of the Red Army as was his heavier "brother," the [T-35](#). Its silhouette is well known from pre-war newsreels about Soviet military parades on Red Square (Moscow).

In 1931 a new project was undertaken to build a three-turret medium tank. It was designed by a group from OKMO ("Opytnij Konstruktorsko-Mekhanicheskij

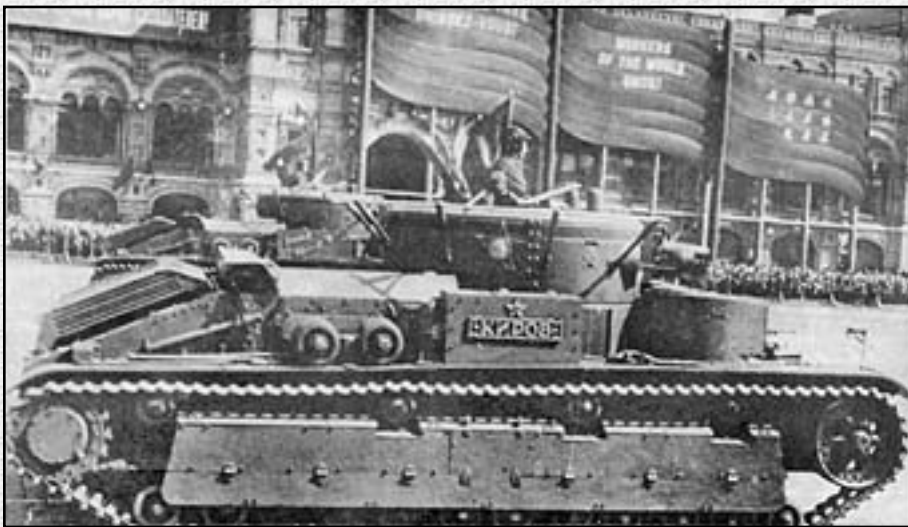
Otdel" - Experimental Design Department) of the "Bolshevik" machine-building plant in Leningrad. The group was led by Chief-Engineer N.V.Barykov and Chief Engineer N.V.Tzeitz.

At the end of 1931 the first prototype was sent to the proving grounds for testing. The main turret of the new tank was armed with a 45 mm gun and a DT machine-gun.

Two other turrets were armed with DT machine-guns only. The main turret was rotated by an electric drive which was a novelty for that time. Initial tests showed many shortcomings in the chassis as well as in the transmission.



The T-28 medium tank. (A.Balakin)



The T-28 on military parade in Moscow

November 1932.

To maintain mass production of a new tank, a special group of engineers was summoned. Later this group was reorganized in Special design bureau #2 (or simply SKB-2) with director O.M.Ivanov, Chief Engineer N.F.Komarchev (in 1933 he was arrested and replaced with A.G.Efimov). In May 1937 O.M.Ivanov was also arrested and replaced with J.Y.Kotin.

By February 25, 1933, the first 8 armored hulls had been produced and assembling of the first 4 tanks began. By 1 May, 12 vehicles were completed, 10 of which took part in a military parade in Moscow and the other two - in Leningrad. On 11 August 1933 the new medium tank was accepted to the Red Army service under the T-28 designation.



The T-28 on military parade in Moscow.

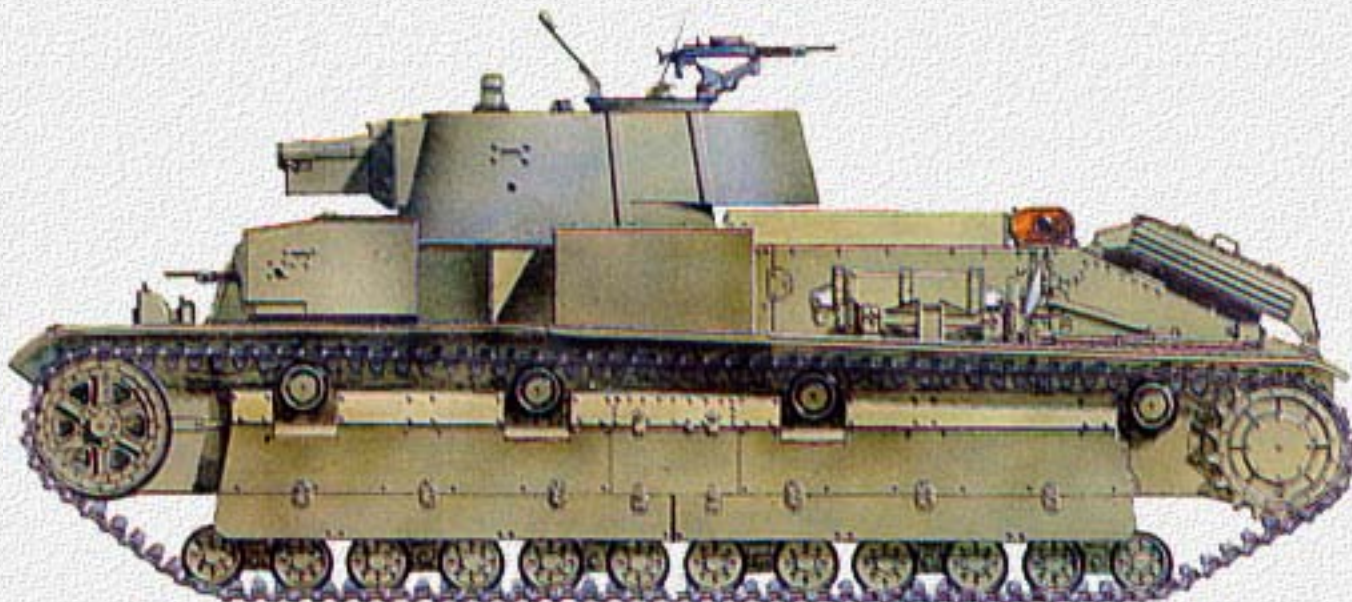
The first order from the Red Army to produce the T-28 (in 1933) was for 90 T-28's. However, up to end of the year the industry could build only 41 new vehicles. A total of 503 tanks were built during mass production runs.

Production T-28's were significantly distinguished from the prototype. The main difference was in the hull: production vehicles had a welded hull instead of riveted. The main turret was modified as well and rearmed with a short barreled 76.2 mm gun KT-

28 (the original name of that gun was KT, the index "28" meant it was modified to be installed in T-28) instead a 45 mm gun. The chassis and transmission were also slightly improved. In general, the T-28 had several versions. The most "improved" was the second series - it had over 600 modifications.

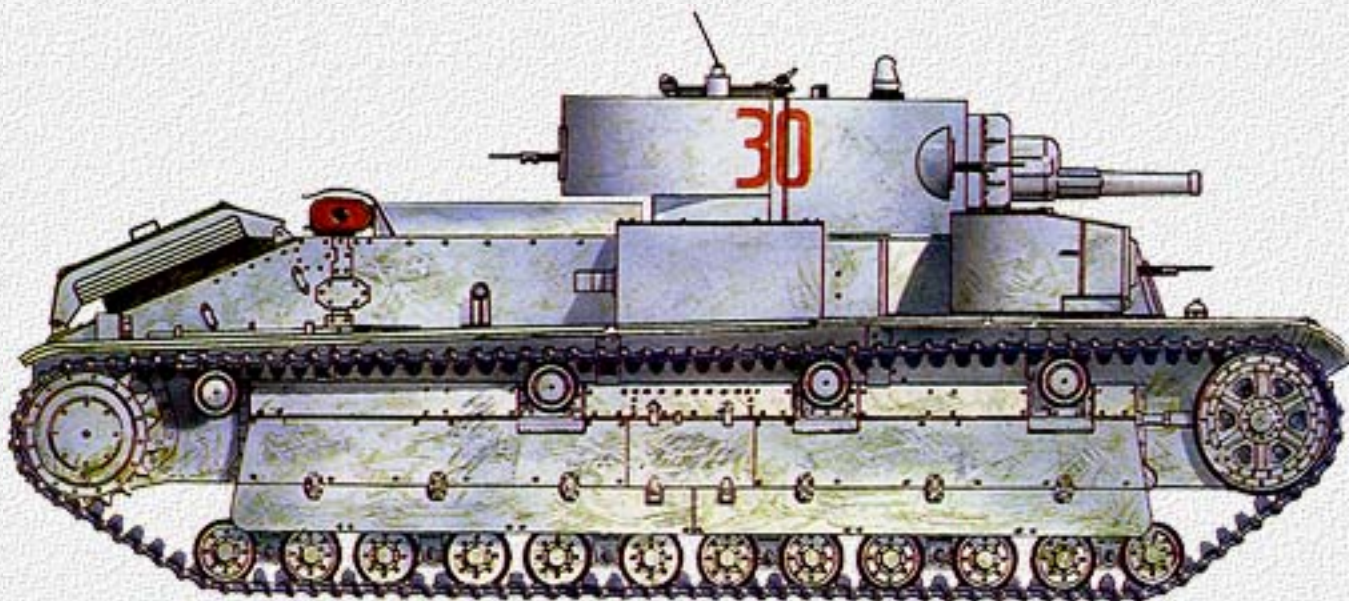
At the time, there were only three major modifications of vehicle:

- From 1938 the tank was re-armed with a 76.2 mm L-10 gun;
- From December 1939 the vehicle received extra protection - armored shields. The frontal armor was increased to 80 mm, the sides - to 40 mm. Weight was increased to 32 tons. Such tanks received a designation T-28e ("e" letter meaning: "ekranirovannij" - extra protected);
- In 1940 the main turret was redesigned again - to a conic form.

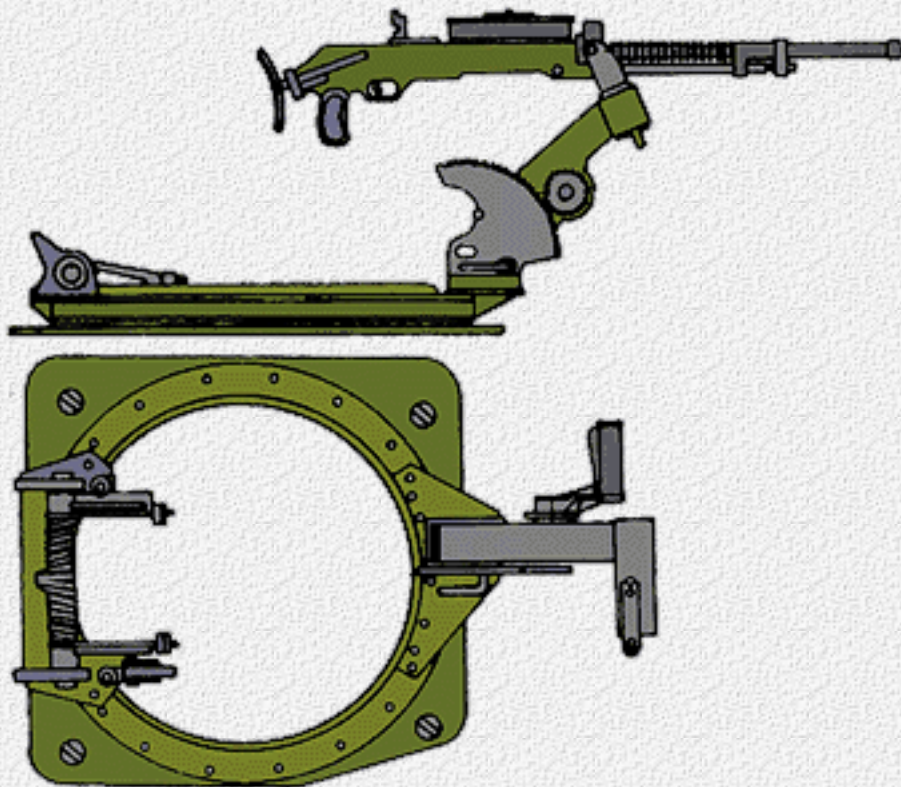


The T-28 with a standard summer camouflage 1940-1941. (A.Balakin)

It should be noted that during mass production the T-28 achieved a high commonality with the T-35 heavy tank. For example, both vehicles had the same main turret (cylindrical and conic versions). Also, the smaller turrets (armed with TMG's) were the same. At first the T-28 was armed with a 76.2 mm short-barreled tank gun: KT-28. Later versions received a more powerful tank gun L-10 with a barrel length of 26 calibers and muzzle velocity of 555 m/s. In fact, there were a very limited number of L-10 guns, and some tanks were still armed with KT.



The T-28 armed with the 76 mm Tank Gun L-10. The tank is painted of common winter camouflage 1943. (A.Balakin)



The P-40 anti-aircraft machine-gun mount.

(V.Potapov)

Both small turrets were armed with DT machine-guns. Each small turret could rotate 165°. The last version was equipped with an AA P-40 machine-gun ring armed with 7.62 mm DT AAMG. In general, the T-28 had quite a modern design for that time. However, at the same time, the tank had some serious shortcomings, especially in the engine and transmission. Despite the designers' efforts these defects persisted. These difficulties were the result of immature technology processes as well as the Red Army's lack of experience in maintaining such complex vehicles.

Nevertheless, in the 1930's the T-28 was the most powerful medium tank in the world. The increasing firepower of anti-tank weapons (especially antitank guns) demanded increased armor protection and increased speed; that's why the multi-turret versions became obsolete.



The T-28 in Action.



T-28 tanks in their way to the front. The Winter War. January 1940.

The first 10 tanks were sent to the 2nd Independent Regiment of RGK of the Leningradsky military district. In fact, independent tank units of RGK were represented since 1924. The 2nd Independent Regiment was formed in 1929. Later, due to production of new T-28 tanks another four tank regiments of RGK were formed: in Smolensk, in Kiev, in Kharkov, and in Slutsk. Organization of these regiments was changed several times.

By the end of 1935, each regiment consisted of three battalions of 30 tanks (T-28 and T-35) per battalion. In December 1935 these regiments were collected into independent heavy tank brigades. In these brigades, tanks of different classes weren't mixed with each other. In other words, a brigade might have T-28's or T-35's but not both types at the same time.

A heavy tank brigade of T-28's consisted of a three common tank battalions, a training battalion, supply battalion and some other units. This organization was created on 12 December 1935 by the order of Minister of Defense. However on 21 May 1936 all these brigades were assigned to the RGK. In 1939 there were four heavy tank brigades: the 4th, 5th 10th, and 20th tank brigades. In a deviation from the policy of matching tank types to units, the 5th tank brigade had both T-28 and T-35.



A pair of T-28 go into action in the late summer 1941. Both vehicles are fitted with P-40 anti-aircraft machine guns mounting on the roof.

Finnish war began (also known as the Winter War). The 10th and 20th tank brigades took part in this war. When the war ended, the 20th Brigade (commander - kombrig Borzilov) was awarded with the Red Banner Order.

During the Winter War, T-28 tanks were used first for direct gunfire on embrasures of a Finnish pillboxes. However the standard 30 mm armor couldn't protect the tanks from Finnish AT-guns. That's why Soviet losses of T-28's were so high. Immediately after those battles, the T-28's were equipped with additional armor.



The ex-Soviet T-28e was captured by the Finns in 1942.

The 4th and 10th tank brigades were the first tank brigades which took part in military conflict. In September 1939 they took part in the occupation of Bessarabia (West Ukraine). After analysis of the first deployment of these brigades, ABTU ordered the reorganization of all tank brigades: now they were to consist of three tank battalions of 156 tanks per battalion (117 T-28 and 39 BT). There were also future plans to replace them with the [KV-1](#).

On 30 November 1939 the Russo-

During the Winter War two T-28 tanks were captured by the Finns. In 1941 they've captured another five vehicles. Those ex-Soviet tanks served up to the end of the war in the one Finnish tank brigade. In 1944 one of those vehicles was modified (all turrets removed) and used as an armored evacuation vehicle up to 1951. **There are rumors, that in 1955 two tanks were sold to Turkey.**

However, not one archival document confirm that.

In March 1940, the Red Army started its new reorganization and formed several mechanized corps. Each mechanized corps consisted of two tank divisions and one

motorised regiment. In that time all tank brigades were disbanded and their tanks were added to the new tank divisions. For example, on 22 June 1941, the 8th Tank Division (4th Mechanized Corps) had 75 T-28 tanks, another 5 vehicles were in 10th Tank Division (15th Mechanized Corps). Both corps were attached to the Kiev military district.



The T-28 knocked out on the roadside during the fighting in Ukraine in July 1941.

trucks and about 100 German soldiers.

The fate of T-28 tanks was the same as for all other Soviet tanks - most of them were lost in the first two months of war. Some of the surviving T-28's served up to 1943 on the Leningradskiy Front and during the Moscow counter-offensive (1941).

On 15 July 1941, the 16th Mechanized Corps received an order from the commander of South-West Front to make a strike on Zhitomir. The 29th Tank Regiment (15th Tank Division) took part in this battle. During a counter-attack at Semenovka (a village near Berdichev) one platoon of T-28's under the command of 1st Lieutenant Vasiliy Sumtsov destroyed three German tanks, two AT-guns, one mortar, 7



The Knocked out T-28 and its dead crew. 1941.

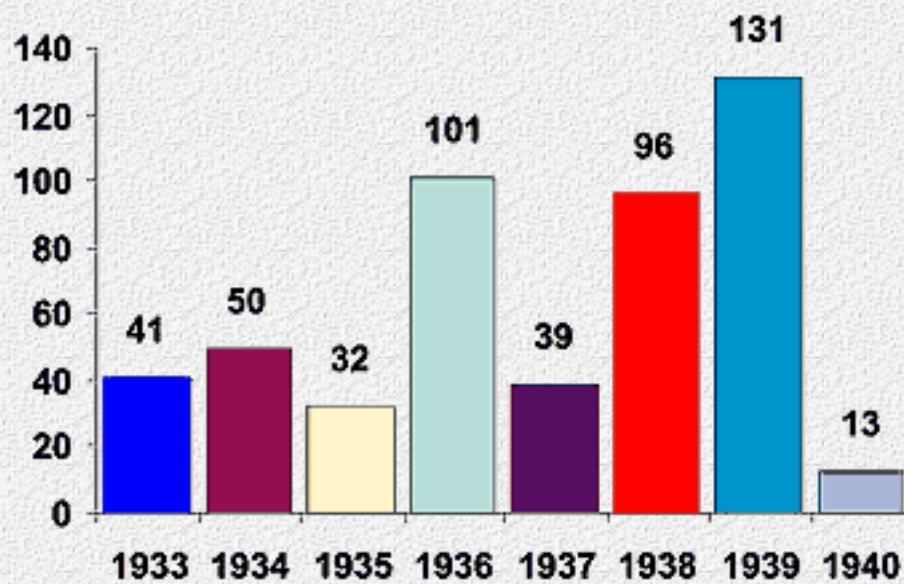
under water T-28PKh.

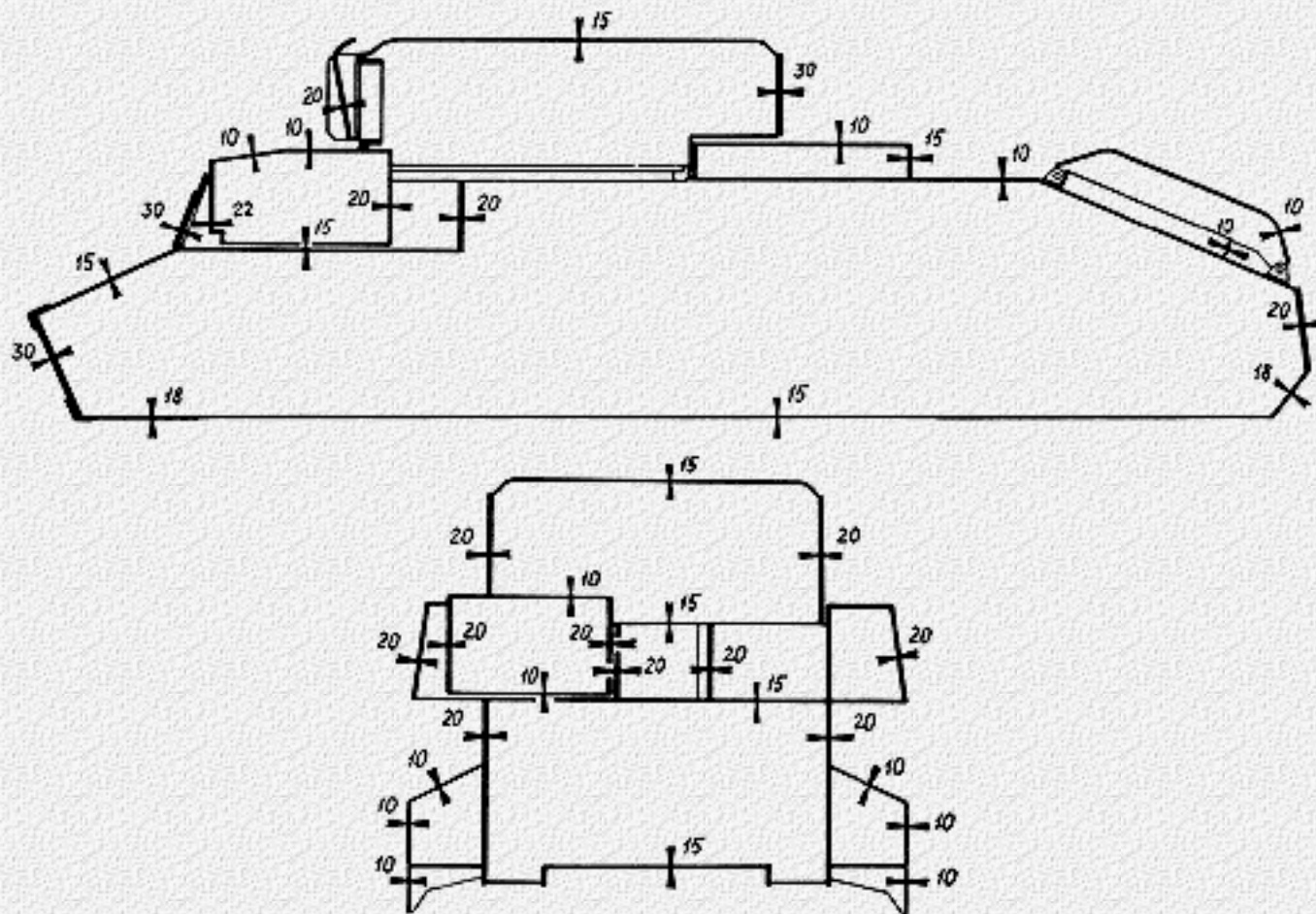
In the summer of 1941 the design of the T-28 became obsolete due to the drawbacks of multi-turret vehicles. German Pz-III and Pz-IV had an equal armor protection but were much more maneuverable, but the T-28 was better armed than any German tank in 1941 and could hit any German tank from long distances.

Experimental tanks had mine-clearing equipment TM-35 or equipment for crossing rivers



The Yearly Output of the T-28





REFERENCES:

[Specification of Soviet tanks](#)

[Specifications of Soviet tank guns](#)

Sources:

M.Baryatinsky, M.Pavlov "T-28 medium tank" Arsenal, 1993

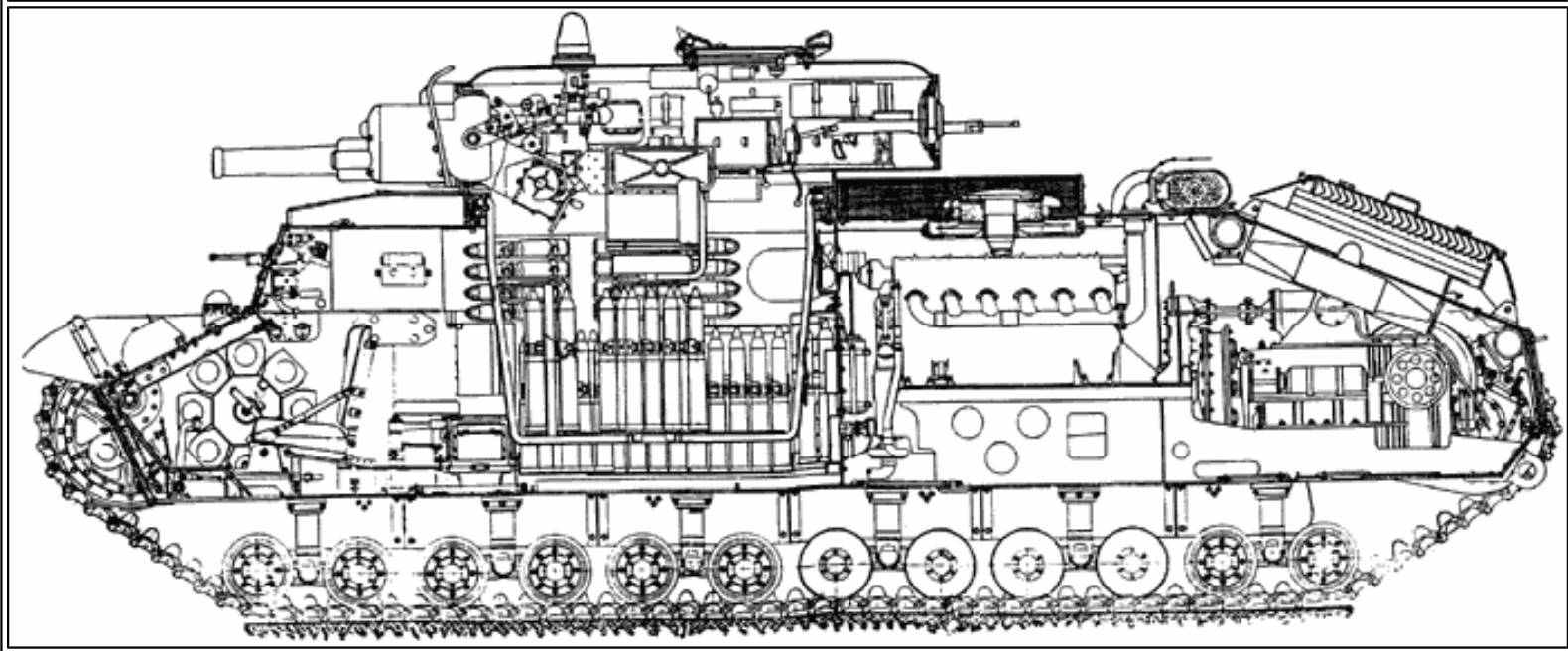
"Soviet tanks in combat 1941-1945. The T-28, T-34, T-34-85 and T-44", Concord Publ. company

M.Baryatinsky "Soviet tanks in the Second World War", 1995

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The Profile of the T-28 Medium Tank



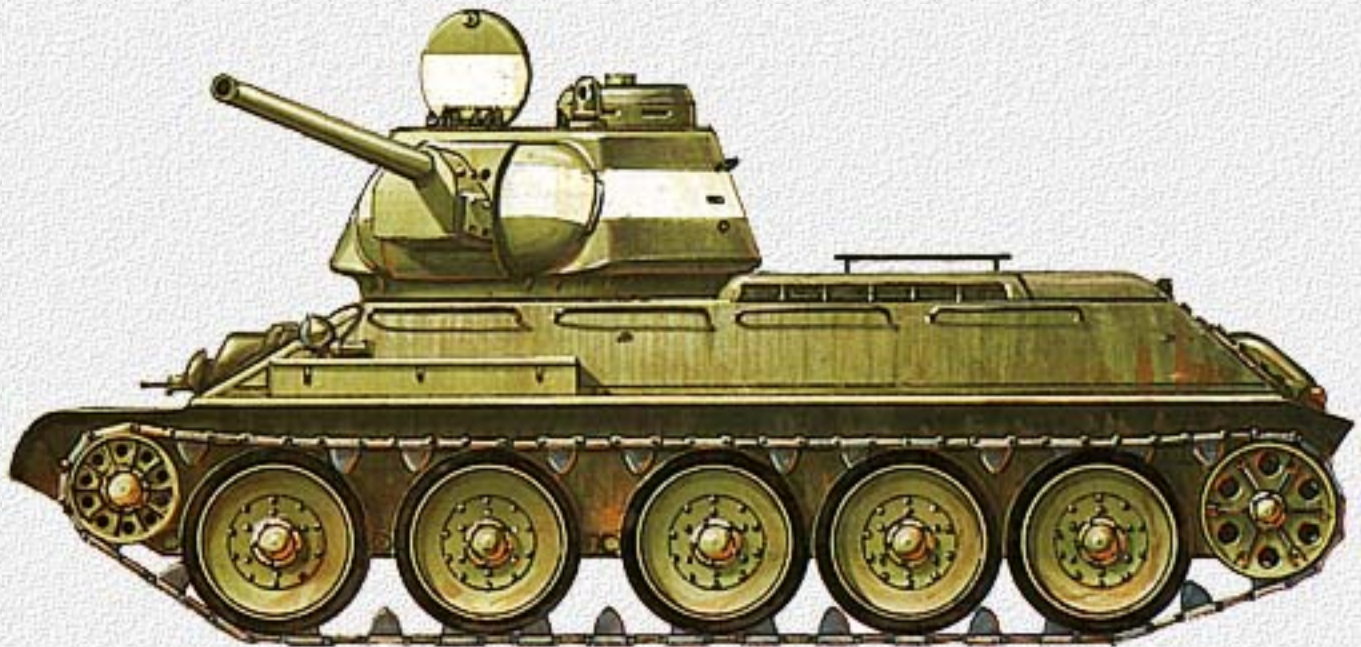
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Michael Pavlov

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Medium Tanks of the T-34 Series

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Prototypes of the T-34-76

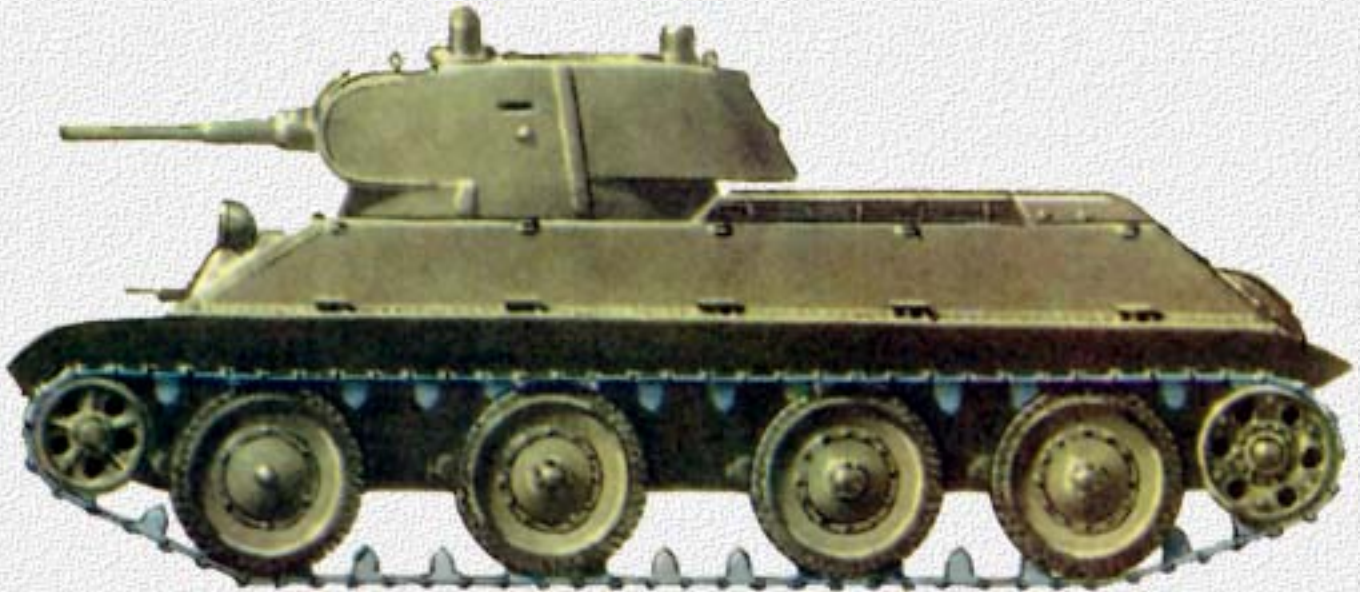


On the 4th of May, 1938 the Ministry of Defense of the USSR held an extended meeting in Moscow. V.I. Molotov presided over the meeting and among those present were I.V. Stalin, K.E. Voroshilov, as well as other state and military officials, representatives of the defense industry, and tank commanders who had just recently returned from Spain. They were

The A-20 experimental tank. 1939.

presented with a plan for a new light wheeled-

tracked tank A-20, designed at the Kharkov Komintern steam engine factory (KhPZ). A discussion developed during the review of the project concerning the practicality of implementing wheeled-tracked drive on the tanks. The participants of the Spanish Civil War who voiced their opinions on this point, in particular A.A. Vetrov and D.G. Pavlov (at the time - head of ABTU) espoused diametrically opposing points of view on the matter. The opponents of the wheeled-tracked design, who constituted the minority, cited the unfortunate experience which involved sending BT-5 tanks to Spain, but their reasons for raising this argument were ambiguous, considering that the mentioned mission was of a very limited nature and involved only 50 BT-5 tanks.



The A-20 experimental tank. *(M.Petrovsky)*

Unsubstantiated were also references to very low reliability ratings of this type wheeled-tracked running gear: in September of 1937, for example, while advancing to the Aragon front the BT's completed a 500-km march on paved roads without any major mechanical problems. One and a half years later, in Mongolia, BT-7 tanks of the 6th tank brigade completed an 800-km march to Halhin-Gol on tracks, also without any major problems. More likely, the point of the disagreement concerned another question: does a battle tank need this dual-purpose drive train? The wheeled drive train was primarily used during traversal of land on smooth roads and at high speeds - an opportunity, which presented itself quite rarely. If built, the drive mechanism of the A-20 would have to be even more complex than that of the BT-7 because by design the A-20 had three pairs of road wheels. The discussion brought up the vital question: was the occasional convenience of wheeled travel worth the price of a more complex drive train?



The A-20 experimental tank on trials at Kubinka proving ground. 1939.



The A-20 experimental tank on trials at Kubinka proving ground. 1939.

There were probably numerous manufacturing, operational, and political reasons against the complex design, but if the bosses wanted a wheeled-tracked tank, why argue? In the end, unexpectedly for the many supporters of the tracked design, and not without Stalin's influence, the construction bureau of KhPZ was entrusted with designing a tracked

tank, analogous in mass and tactical/technical characteristics (except of course for the running gear) to the A-20. The decision concerning the drive system was going to be finalized after comparative field testing of the prototypes. Here, it would be appropriate to deviate from our discourse and take a look into the history of development of A-20 to remind the reader of a few significant facts, because it was none other than the A-20 that became the precursor of the tank which would later come to be known as T-34. In 1937, Factory #183 (KhPZ received this number in the second half of the year) in

accordance with the tactical-technical characteristics required by ABTU, was given the task of designing wheeled-tracked tanks BT-7IS and BT-9, as well as making preparations to produce 100 BT-7IS's in the same year. This work was hindered by the construction bureau KB-190, department "100" (tank production), headed since January 1937 by M.I. Koshkin. On top of that, Koshkin in various ways deterred the work of military engineer of 3rd rank and junior scientific assistant of the Stalin VAMM, Adolf Yakovlevich Dick, who was specifically sent to KhPZ to work out several modifications of BT-IS.



The A-20 experimental tank on trials at Kubinka proving ground. 1939.

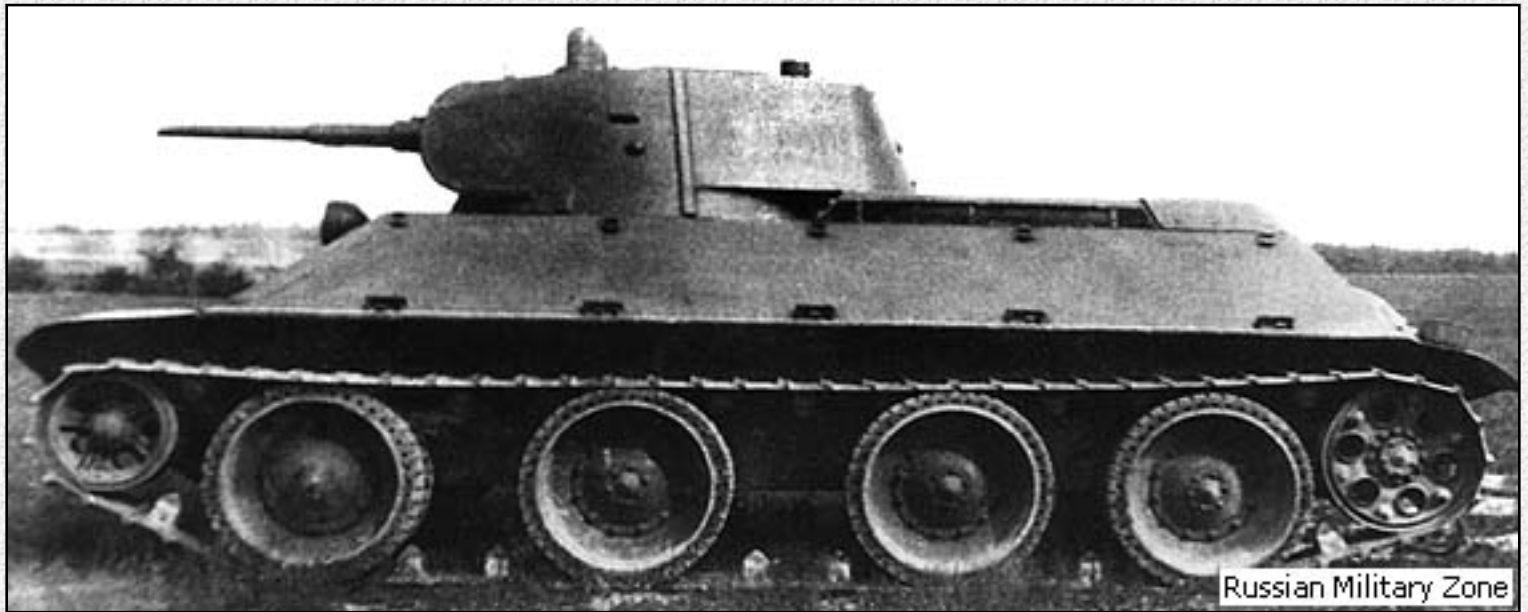
On the 13th of October 1937, ABTU stated the demand for the design of a new machine - the wheeled-tracked tank BT-20. In two weeks the director of Factory #183 Y.E. Maksarev received the following order from the Chief Directorate:

"To the director of the Factory #183.

By the Government Resolution #94 of August 15, 1937, the Chief directorate has been offered to design and create experimental versions of a high-speed wheeled-tracked tank with synchronized drive and to prepare the factory for their mass production by 1939. Considering the extreme importance of this work and tight deadlines imposed by the Government, 8th Chief directorate (**Narkomat**

of the defense industry - Valera) deems it essential to take the following actions:

- 1). Create a separate construction bureau (OKB) at KhPZ, which will be under direct supervision of the head engineer of the factory.
- 2). In accordance with VAMM and ABTU, appointed A.Dick, military engineer of 3rd rank and junior scientific assistant of the academy as the supervisor of this bureau and appoint a team of 30 VAMM graduates for work in the bureau starting on the 5th of October with 20 more persons being added by the 1st of December.
- 3). In accordance with ABTU RKKA appoint Captain Evgenij Anatolievich Kulchitsky as the head consultant for the new machine.
- 4). No later than by the 30th of September, select for work in OKB the 8 best tank constructors at the factory so that they can be appointed as supervisors of individual groups, as well as a standards official, a secretary, and a record keeper.
- 5). Create a mock-up shop in the OKB and ensure the right of first priority for all work connected with the new development in all the shops of the factory.
- 6). Recognize the crucial necessity to design three versions of the running gear and build two experimental examples, as affirmed in the review of the projects.
- 7). Conclude an agreement with ABTU to conduct the work no later than by the 15th of October, 1937."



The A-20 experimental tank on trials at Kubinka proving ground. 1939.

As a result, the newly created design bureau was much more powerful than the main KB. For the development of the new tank ABTU sent to Kharkov captain E. A. Kulchitski, military engineer of 3rd rank A.Y. Dick, engineers P.P. Vasiliev, V.G. Matyukhin, Vodopianov, and 41 VAMM graduates. In its turn the factory selected constructors A.A. Morozov, N.S. Korotchenko, Shur, A.A. Moloshtanov, M.M. Lurie, Verkhovskii, Dikon, P.N. Goryun, M.I. Tarshinov, A.S. Bondarenko, Y.I. Baran, V.Y. Kurasov, V.M. Doroshenko, Gorbenko, Efimov, Efremenko, Raidochin, P.S. Sentyurin, Dolgonogov, Pomochaibenko, V.S. Kalendin, and Valovoi. The supervisor of the OKB was appointed to be A.Y. Dick, the assistant supervisor - engineer P.N. Goryun, consultant of ABTU - E.A. Kulchitskii, section supervisors - V.M. Doroshenko (control), M.I. Tarshinov (hull), Gorbenko (power plant), A.A. Morozov (transmission), and P. P. Vasiliev (drive train).



The A-20 experimental tank on trials at Kubinka proving ground. 1939.

All information about the work of this team that has been discovered so far, ends abruptly at the beginning of November 1937. However, it is positively known that TTT for the tank BT-20 (factory index - A-20) in many ways were based on the design concepts of A.Y. Dick, created in the summer of 1937. Primarily this concerns the construction of gear train, inclination angles of the upper parts of the hull sides, longitudinal placing of propeller shafts in the chassis, angled placement of springs, etc. Even Dick's idea of using five pairs of drive wheels in order to better distribute the load on the chassis found practical application on later machines (however, not on the A-20).



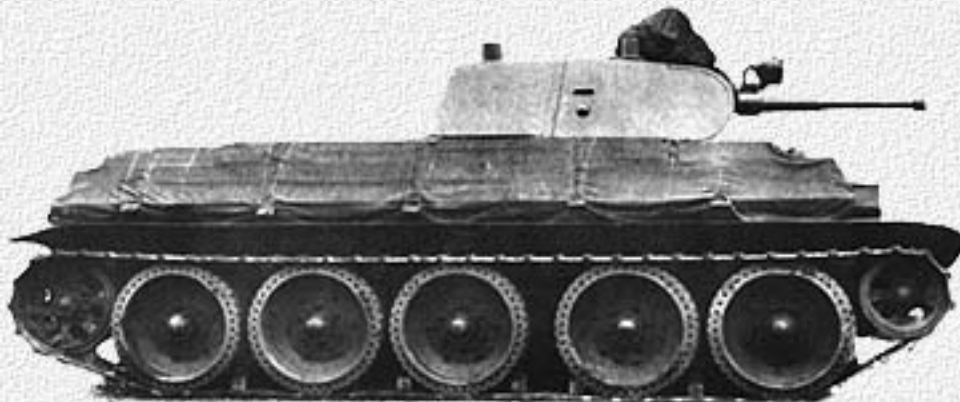
The A-32 experimental tank. 1939. *(M.Petrovsky)*



The A-32 experimental tank. *(M.Baryatinsky)*

The published materials about the history of development of T-34 do not talk about OKB, but only mention a section or bureau of perspective development headed by A.A. Morozov, essentially with the same personnel. In the album "Kharkov construction bureau for machine-building of the name of A.A. Morozov," published in Kharkov for the 70th anniversary of KB, it is mentioned that in order

to complete the task of developing a new wheeled-tracked tank M. I. Koshkin organized a new subdivision - KB-24. He personally picked the constructors from the volunteers of KB-190 and KB-35 **(the latter was responsible for managing the mass production of the heavy tank T-35. - Valera)**. This team included 21 people: M. I. Koshkin, A. A. Morozov, A. A. Moloshtanov, M. I. Tarshinov, V. G. Matyukhin, P. P. Vasiliev, C. M. Braginskii, Y. I. Baran, M. I. Kotov, Y. S. Mironov, V. S. Kalendin, V. E. Moiseenko, A. I. Shpaihler, P. S. Sentyurin, N. S. Korotchenko, E. S. Rubinovich, M. M. Lurie, G. P. Fomenko, A. I. Astahov, A. I. Guzeeva, and L. A. Bleimshmidt. At the above-mentioned meeting of the Ministry of Defense the A-20 project was presented by M. I. Koshkin and A. A. Morozov. But let's return back to 1938.



The second variant of the A-32 armed with the 45 mm gun. The tank is load additionally to the 34 tones.

Factory trials. August-September of 1939.

The technical development of a tracked tank, designated A-32, did not take long because its appearance was identical to that of A-20, except for the running gear, which had 5 drive wheels on each side (not 4, like on the A-20). In August 1938 both projects were presented at the meeting of the Chief Military Council of RKKA at the Ministry of Defense. The general opinion of the participants was again leaning toward the wheeled-tracked

tank. Once again, Stalin's opinion was the deciding factor: he suggested to build and test both tanks and then make the final decision. The urgency of drawing up the blueprints prompted the expansion of the design team. In the beginning of 1939, the three design teams at Factory #183 - KB-190, KB-35, and KB-24 - were united into a single entity, code named - division 520. At the same time all of the research shops at the factory were also merged. M. I. Koshkin became the head designer of division 520, A. A. Morozov became the supervisor of the KB and deputy head constructor, and N. A. Kucherenko became deputy supervisor. By the May of 1939, trial versions of the new tanks were produced in metal. Before July both machines were undergoing factory tests in Kharkov, and between 17th of July and 23rd of August they underwent field tests. In the test report it was pointed out that neither machine had the full inventory of mandatory equipment. This especially concerned the A-32, which lacked OPBT instrumentation; 6 of the 10 drive wheels were borrowed from BT-7 and battle stowage was not properly furnished.



The A-32 experimental tank on factory trials. 1939.

The commission responsible for conducting the tests made the following comments on the difference between the A-32 and A-20: the former does not have wheeled drive, its hull armor is 30 mm thick (instead of A-20's 25 mm), the main gun is a 76-mm L-10 instead of a 45-mm, its mass is 19 tons.

Ammunition storage in the front and on the sides of the A-32 was configured for 76-mm shells. Because of the absence of wheeled drive and the presence of 5 drive wheels, the inner part of the A-32's hull was slightly different from that of A-20. In other respects, there were no major differences between the two tanks. TTH (technical/tactical characteristics) of both tanks were adjusted during the tests. In the course of factory testing A-20 traveled 872 km (655 km on tracks, 217 km on wheels) and A-32 - 235 km. During the field tests A-20 traveled 3267 km (2176 km on tracks), A-32 - 2886 km. The head of the commission colonel V. N. Chernyaev hesitated to pick either machine as a winner and concluded that both tanks passed the testing successfully. This again raised the earlier question. On the 23rd of September 1939 there took place a tank show, conducted for the Red Army command. Among those present were K.E. Voroshilov, A.A. Zhdanov, A.I. Mikoyan, N.A. Voznesenskii, D.G. Pavlov, and others, as well as the

chief designers of the tanks.



The A-32 experimental tank on factory trials. 1939.

Besides the A-20 and the A-32, heavy tanks KV, SMK and T-100 and light tanks BT-7M and T-26 were also brought to the proving grounds. The performance of the A-32 was quite commendable. With seeming effortlessness, the tank surmounted a trench, escarpment, counterescarpment, track bridge, forded a river, climbed a 30° incline and

finally, to the great delight of the spectators, toppled a large pine tree with the front section of the hull. From the results of the tests and the demonstration it was suggested that since the A-32 could potentially support a larger weight, the armor should be increased to 45 mm, with all the supporting parts reinforced appropriately.

In fact, two of such tanks were already being produced at the shop of Factory #183, under the factory index A-34. Simultaneously, in October-November of 1939 tests were being conducted with two A-32 whose mass has been increased to 6830 kg, equal to that of A-34. The factory was in a hurry to build the new tanks in time for the 7th of November and employed all of its resources to achieve this goal. However, technical difficulties with power units and transmissions slowed down the production. Despite this delay, all assembly was still made very carefully, all threaded joints were treated with hot oil, and all friction surfaces were wetted through with distilled lubricating grease. Ignoring the protests of military representatives the transmissions were assembled exclusively with imported bearings. Both inner and outer surfaces of the hull and turrets were subject to comprehensive finish. The rather complex technology involved in the production of armored parts for the two tanks did not contribute to faster production either. In particular, the forward section of the hull was fabricated from a single armor plate, which first had to be tempered, then formed, and tempered again. During the tempering and hardening process the parts got damaged and cracks formed during forming. The substantial size of the parts made them difficult to handle during improvement of mistakes.



The A-32 experimental tank on factory trials. 1939.

The turret was also welded from large bent armor plates. The openings (for example, the embrasure of the gun) were cut out after forming, which caused great difficulties during the fabrication. At the same time, by the decree of the Ministry of Defense of SNK USSR #443ss, the A-34 tank was recommended to be accept for service under the designation T-34 "in case it will successfully pass a 2000-km race".



The first variant of the A-34 experimental tank. 1940.

The production of the first A-34 was completed in January 1940; that of the second one - in February. Army tests started immediately and were documented in official evaluations:

"The first A-34 vehicle passed 200 km of testing. Off-road capability is good. The accompanying BT often got stuck and had to be rescued by the A-34. However, visibility is terrible. The glass fogs up

and gets covered by snow within 7-10 minutes. Further progress is impossible - the windows have to be cleaned from the outside. The turret is cramped. 02/15/40. We returned from the run. The tank was taken to have the mask installed. The second A-34 - conducted the break in, all mechanisms are working normally."



The second variant of the A-34 experimental tank at Kubinka. March 1940.

After the 250 km run, the first A-34 suffered from a malfunctioning engine, with only 25 hours of operation, which had to be replaced. By February 26th this machine had traveled only 650 km, and the second one - only 350. It became obvious that it will be impossible to conclude all of the testing - 2000 km worth - before the government showing, scheduled for March, and without the completion of the testing, the tanks could not take

part in the demonstration. That's when it was decided to drive both A-34s from Kharkov to Moscow, thus accruing the needed mileage in the process. At the special meeting of the party committee of the factory, M.I.Koshkin was appointed as the person responsible for the task.

On the morning of March 5th (according to other sources, on the night of March 5th-6th), a procession of two A-34s and two tractors "Voroshilovets," one of which was outfitted as living quarters and the other - fully stocked with spare parts, started out down the road to Moscow. To keep the journey secret, the rout circumvented all major towns and roads. The use of bridges was permitted only if it was impossible to cross a river by ice at night. The schedule of the journey took into account not just the time needed for travel and rest, but also the schedule of trains at railway intersections and the predicted weather conditions along the route. The average speed had to be no greater than 30 km/hour. Unfortunately, trouble started fairly soon, not far from Belgorod. While

traversing a snow field, one of the tanks lost its main friction clutch. In a number of publications this is attributed to the inexperience of one of the drivers.



The second variant of the A-34 experimental tank at Kubinka. March 1940.

However, this seems unlikely because the driving was entrusted to the best test drivers at the factory, with hundreds of kilometers of experience. Y.E. Maksarev offers a different explanation in his memoirs. According to him, "a representative of GABTU got behind the controls and started

turning the machine on snow at full speed, which caused the malfunction of the main friction clutch." M.I. Koshkin decided to continue the journey with just one tank and to have a repair team from the factory fix the other one. In Serpukhov, the vehicles were met by the deputy people's commissar of intermediate machine production A.A. Goreglyad (in 1939 control of all tank factories was given over from Narkomoboronprom to Narkomsredmash). The working tank arrived in the suburbs of Moscow at the Factory #37, located in Chergizov.

During the next several days, until the second tank had not arrived, the factory was visited by representatives from NTK GABTU, VAMM, and Chief Headquarters of RKKA - all of whom wanted a peek at the new machine. During one of these days, M.I. Koshkin became ill and had a fever - the cold weather on the trip took its toll. On the night of March 17th both "34s" arrived at the Ivanov square in the Kremlin. Besides M.I. Koshkin, only two other workers of Factory #183 were admitted into the Kremlin.



The second variant of the A-34 experimental tank on testing for fire safety. Kubinka proving ground. Spring 1940.

Driver of the tank #1 was N.F. Nosik, and that of #2 - I.G. Bitenskii (according to other sources - V. Dyukanov). Next to them, in the position of the gunner sat employees of NKVD. In the morning, the tanks were approached by a large group of party and government officials - I.V. Stalin, V.M. Molotov, M.I. Kalinin, L.P. Beriya, K.E. Voroshilov and others. The head of GABTU D.G. Pavlov gave the report. After him spoke M.I. Koshkin. Despite the medicine that he took, Koshkin could not restrain himself from coughing, which prompted disapproving glances from I.V. Stalin and L.P. Beriya.



The second variant of the A-34 experimental tank at Kubinka. March 1940.

After the report and the inspection, the two tanks drove off in opposite directions: one - to the Spasskie gates, the other - to Troitskie. Before reaching the gates, they turned around sharply and headed toward each other, sending sparks from under the tracks. After completing several laps and turns, the tanks stopped back in the starting position. Stalin liked the new machines and ordered that Factory #183 receive all the necessary assistance to eradicate the minor faults of A-34, which were explicitly pointed out to him by the deputies of people's commissar of defense, G.I. Kulik and D.G. Pavlov. The latter boldly said to Stalin: *"We will pay a big price if our vehicles are not battle worthy enough."*

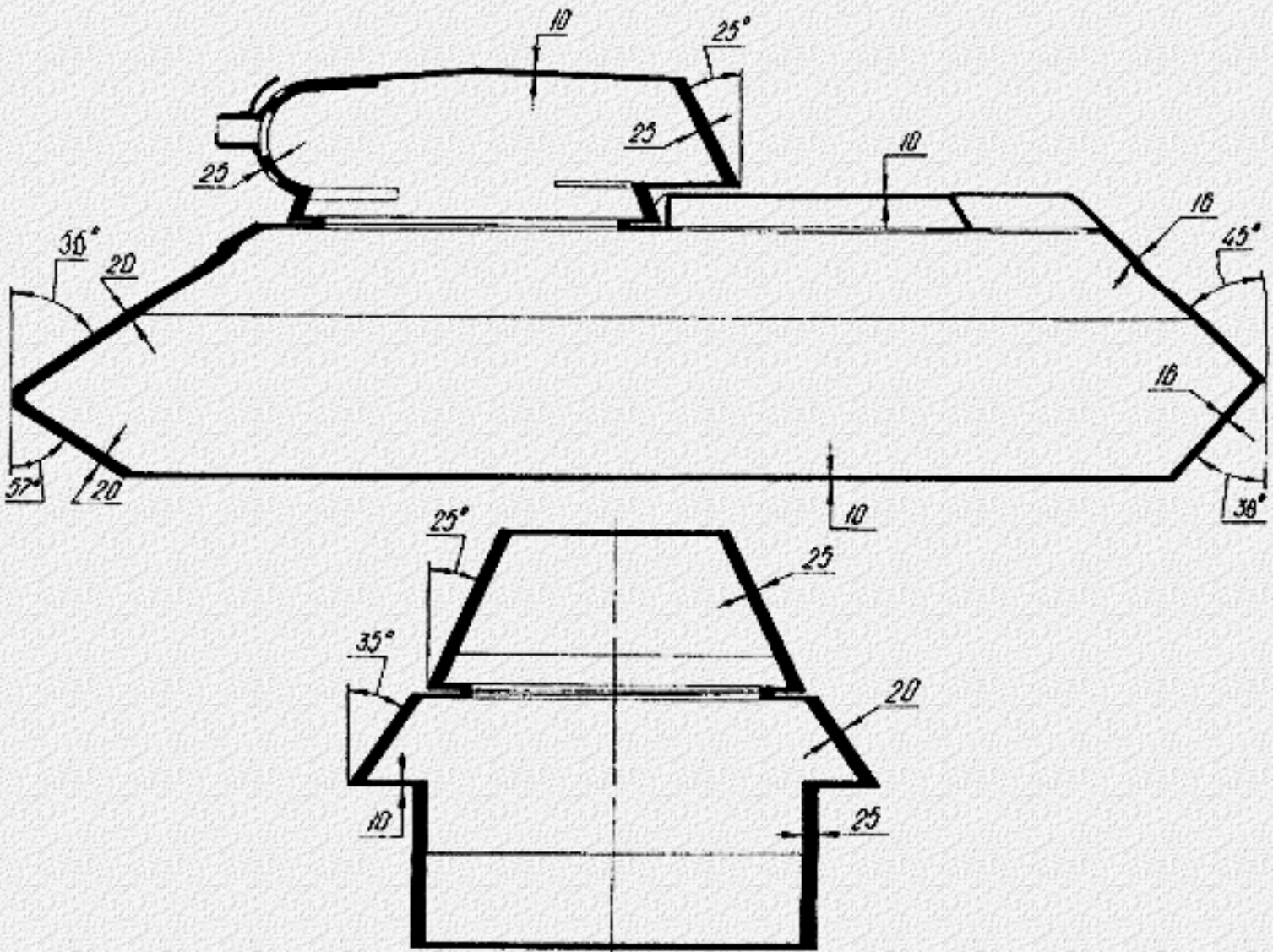


The production T-34 Model 1940 armed with the 76 mm gun L-11.

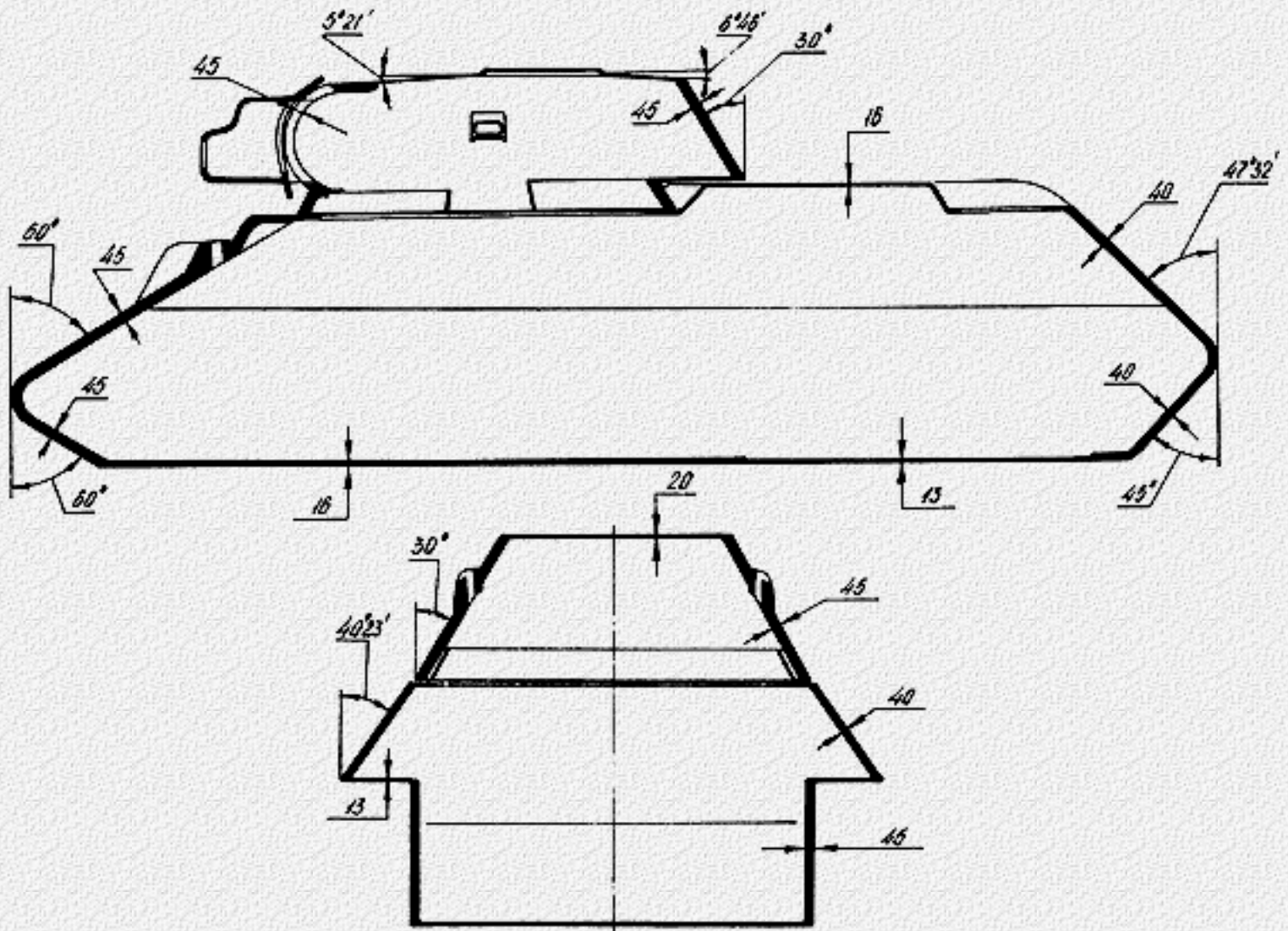
After the Kremlin inspection the tanks headed to the Kubinka proving grounds where they

were subjected to 45-mm gun fire. After that, the machines moved on, taking the route Minsk-Kiev-Kharkov. On March 31st 1940, the Defense Ministry signed a protocol which ordered the mass production of T-34(A-34) at the Factory #183 and STZ with a significant stipulation "if the A-34 will pass all army tests". Upon their arrival in Kharkov after the 3000 km run, a number of defects was found in the tanks: there was burned ferodo on the main friction clutch disks, cracked blowers, fractured transmission gears, burned out brakes. The KB was working to fix these defects, but everybody knew that even after modifications the A-34 would not be able to successfully complete the 3000 km guaranteed under the warranty. Nevertheless, the plant adopted a mass production program for 1940, which specified the production of 150 A-34 tanks.

Armor Protection of the A-20



Armor Protection of the A-34



REFERENCES:

[Specification of Soviet tanks](#)

[Specifications of Soviet tank guns](#)

Translation:
[Leonid Sapronov](#)

Sources:
M.Pavlov, I.Pavlov, I.Zhelto "Sovetskie Srednie Tanki Dovoennogo Perioda", Armada, 2000;
"Srednij tank T-34. Albom konstruktivnikh elementov", NKTP, 1941;
"T-34. Obsluzhivanie", NKTP, 1941;
"T-34. Rukovodstvo po ispol'zovaniu", Voenizdat, 1941;
Bronekolleksiya #3, 1999;
I.Shmelev "T-34", *Tekhnika i Vooruzhenie* #11-12, 1998;
S.Zaloga, J.Grandsen "T-34 in action".

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Medium Tanks of the T-34 Series

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Development History of the T-34-76

On June 5, 1940, the SNK USSR and Central Committee of the Communist Party signed a resolution "About manufacturing T-34 tanks in 1940", which says:

"Attaching importance to equipping the Red Army with T-34 tanks, Council of the Peoples Commissars of the Soviet Union and Central Committee enacts:

1. Require People's Commissar of the Machine-Building Comrade A.I. Likhachev:
 - a. to produce 600 T-34 tanks in 1940:
 - by factory #183 - 500 tanks;
 - by Stalingradsky Tractor Factory - 100 tanks; and
 - by the following plan:

Month	VI	VII	VIII	IX	X	XI	XII
Factory #183	10	20	30	80	115	120	125
STZ	-	-	-	-	20	30	50

b. to supply the whole program 1940 with diesel engines, for that purpose need to increase the V-2 production by factory #75 and manufacture 2,000 engines until the end of year..."



**The very first T-34 and it's not armed yet.
The Kharkov Factory. 1940**

Nevertheless this plan failed. Moreover, in summer 1940 the clouds were gathering over the T-34. The point is that two Pz-IIIs were bought in Germany and delivered to Kubinka for comparative tests. Soviet documentation does not clarify the exact modification of the Pz-III, in all cases it was named as "German T-III". The results were unfavourable for the Soviet T-34.

The T-34 was superior in terms of protection and firepower, but that's all. The Pz-III had a cosy three-man turret with a commander's cupola. Each crewman had an internal communication device at his service. In contrast, the T-34 had a very cramped two-man turret without a commander's cupola. Only the tank commander and the driver had internal communication.

The German tank had a very smooth motion and wasn't as noisy as the T-34: moving with maximum speed the Pz-III could be heard from 150-200 metres while the T-34 could be heard from 450-500 metres.



One of the first production T-34. 1940.

(M.Baryatinsky)

Soviet engineers were surprised by Pz-III's maximum speed. It was far superior and could run up to 69.7 km/h whereas the T-34's best result was 48.2 km/h. The BT-7, which was used as a standard model, could run on wheels at only 68.1 km/h. The report of those tests indicates that the Pz-III had better suspension, a high quality of German optics, a handy layout of ammunition and radio, and a

reliable engine and transmission.

By those results the GABTU issued a summary document for Marshal G.I.Kulik, who affirmed it and ordered production of the T-34 to cease until improvements were made in all revealed defects and drawbacks. Large wrangles occurred. They've were cancelled by the personal meddling of Marshal K.E.Voroshilov: *"Tank production must be continued with guaranty race of 1,000 km. Factory must develop a new tank - [T-34M](#) with improvements not only in its protection but also in running capabilities, so the new five-speed gearbox should be used."*



The T-34-76 Model 1940 armed with the L-11 Tank Gun.



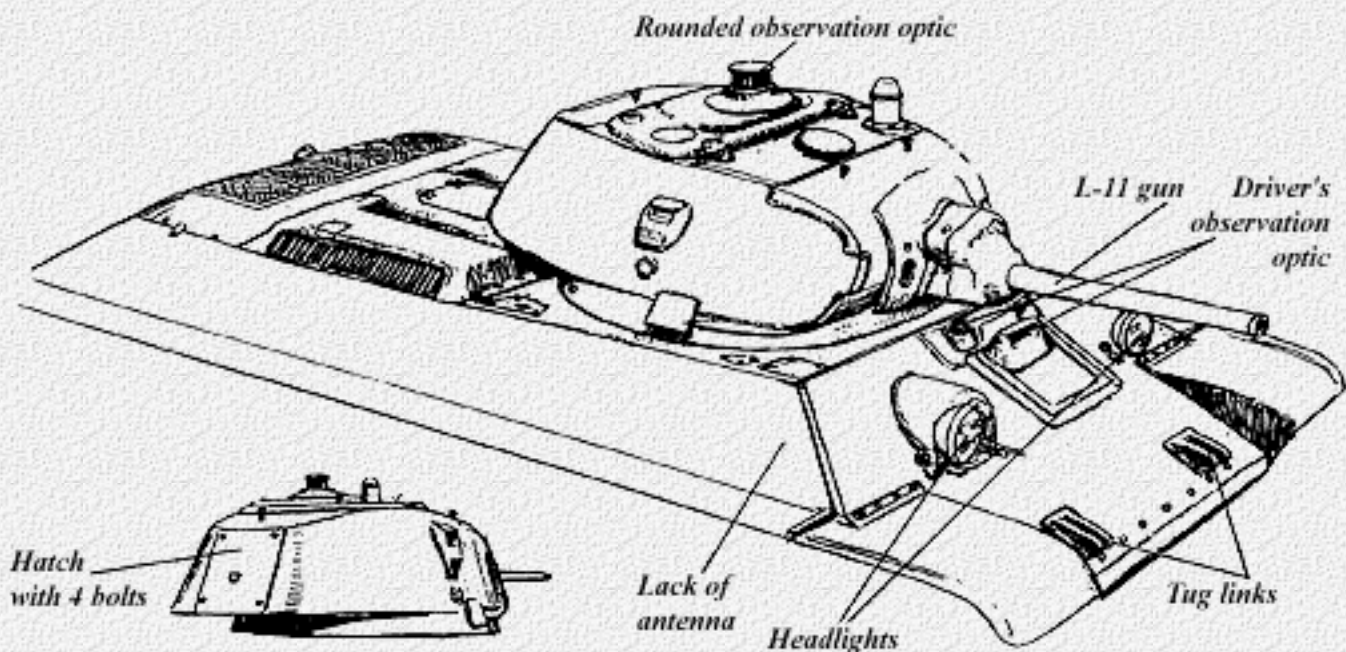
The T-34 armed with the F-34 gun on trials at the Gorokhovetsky proving ground. November, 1940. (M.Baryatinsky)

At that time, M.I.Koshkin's health became worse as he was taken ill with single pneumonia in March 1940. On September 26, 1940, he died. A.A.Morozov became the Chief-engineer of the T-34 project.

Under his guidance the design bureau developed two variants of the T-34's modernisation. The first variant, named the A-41, was an attempt to improve most of defects without developing a new hull and drive train. It had a new three-man turret with a ring diameter of 1,700 mm (standard T-34 has a diameter of 1,420 mm). It was intended to

rearm with the newest 76.2 mm F-34 gun, but due to unclear reasons that project was left on paper.

The second variant, named the A-43 and also known as the [T-34M](#), was narrower, higher and longer than the production T-34.



Features of the T-34-76 of pre-war manufacturing 1940-1941.



The pre-war T-34-76 sunk in the swamp. Notice two boxes on the left belt. There are external fuel tanks of 33.5 litres each. (RGAKFD)

Simultaneously with the A-43 development, the Factory #183 continued mass production of the T-34. The first three tanks left the factory's gates by September 15, 1940. Until the end of year a total of 115 tanks were produced or 19% of the initially planned output. STZ didn't produce anything at all. All it could make were 23 half-assembled tanks.

Such a dramatic situation is quite understandable. The T-34 was a completely new tank, it required new technologies to be introduced successfully. Suppliers and manufacturers of various elements of the T-34 also needed time to adjust their technology bases. For example, Mariupol's turrets needed to be improved due to their inaccurate geometry and dimensions. In spite of simplified assembling techniques (for instance the frontal glacis was now welded from two armour plates), the T-34's production was still very difficult and as a result very expensive.

With enormous effort factory #75 could produce a V-2 engine that worked 150 hours without a failure! Such huge problems! A special test bench was built for verifying the correct and accurate dispersion of fuel and it's even feeding. All 12 atomisers of the V-2 were tested here. All atomisers, valves and needles were manually ground in.

T-34s of the first series were armed with the 76.2 mm L-11 gun. Mass production of L-11 guns was cancelled in 1939 in favour of the F-34 gun, so only about 400 T-34s were armed with the L-11. Tanks of all other modifications were armed with either the F-34 or its modernised variant the F-34M. Being more powerful than the L-11 or F-32, that gun was developed in 1939 by Grabin's design bureau. Initially it was supposed to be used for T-35 and T-28 tanks. On October 19, 1939, mounted on a T-28, the F-34 was tested on the Gorokhovetsky proving ground. From 20 to 23 November 1940 the F-34 was tested in a T-34 tank (the tests consisting of 1,000 shots). As a result of those tests the F-34 was recommended to be accepted for service.

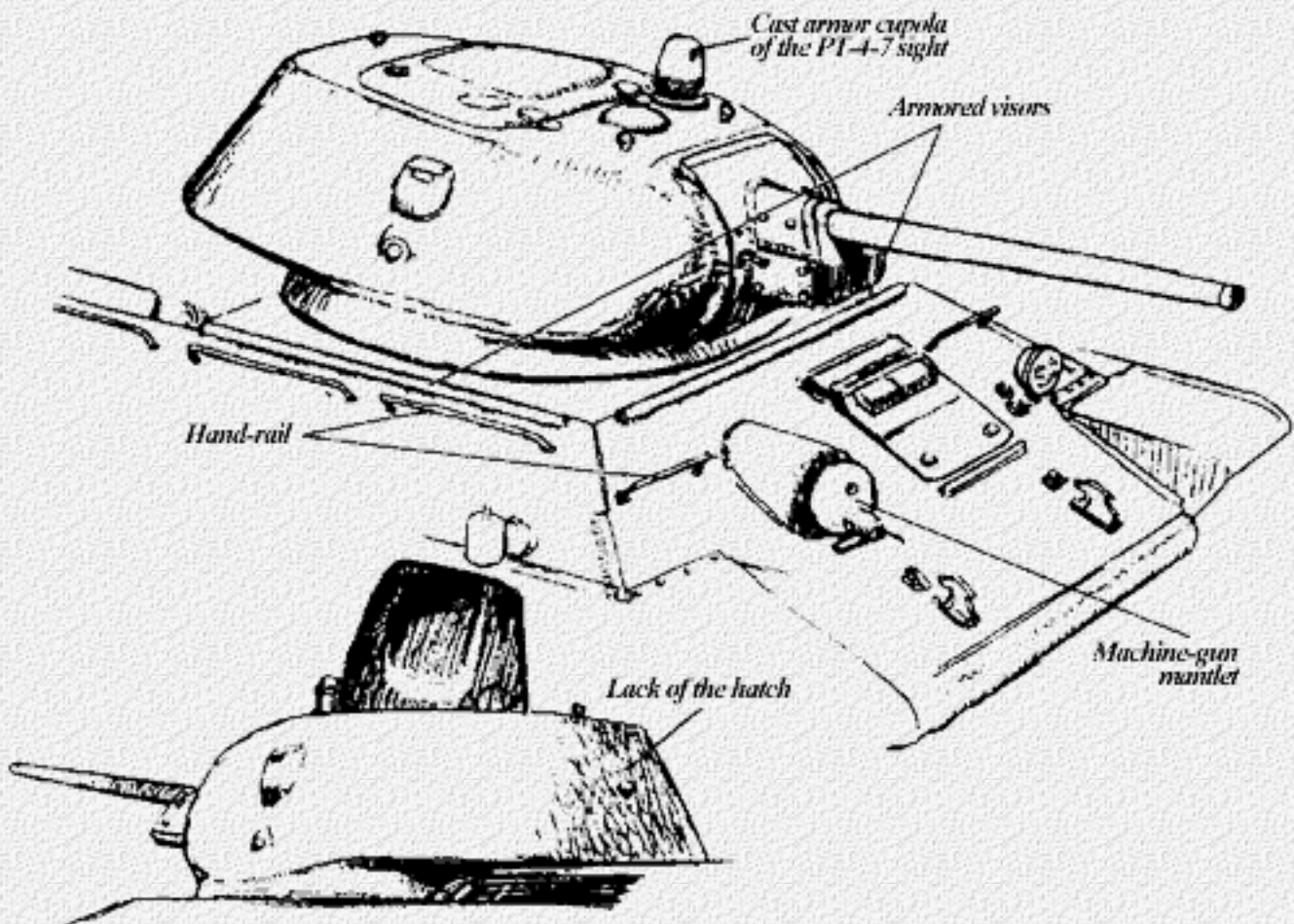
Please remember! Despite being a commonly held view, not one T-34 was armed with the F-32 tank gun!



The T-34-76 Model 1941 sunk in the swamp.
(M.Baryatinsky)

At the same time, according to order #76791 of the Minister of Defence (October 25, 1940), the first three T-34s were tested intensively on the Kubinka proving ground. A special commission revealed so many defects and drawbacks that it doubted the T-34's combat capabilities. Questions about cancellation of production and even abandonment of the whole project (!!!) were raised again.

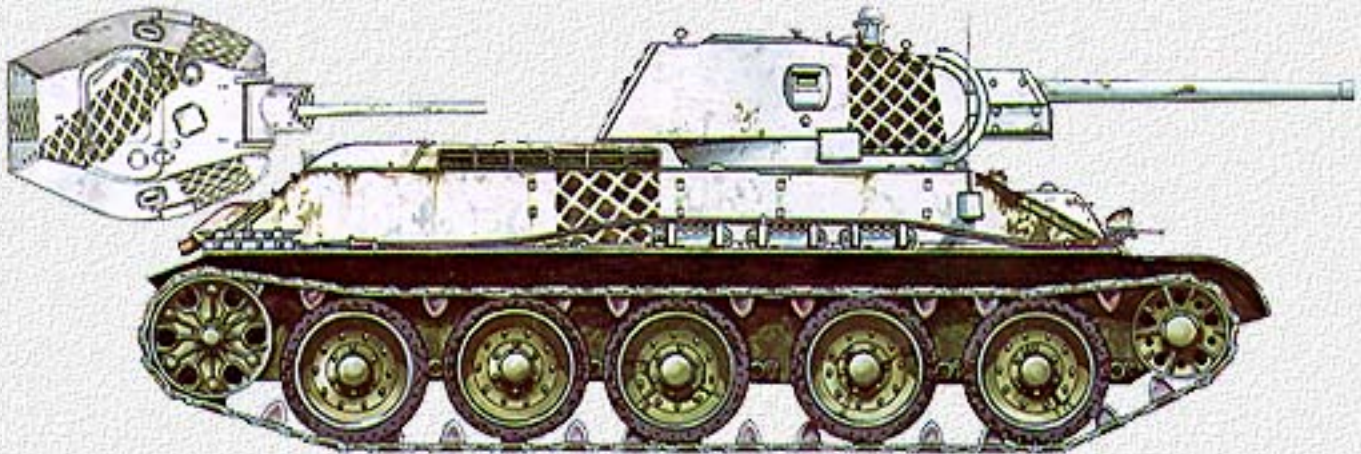
Furthermore, some of the leaders of GABTU and Ministry of Defence maintained the idea that the T-50 should be the most mass produced tank, not the T-34.



Features of the T-34-76 of the Factory #112 "Krasnoye Sormovo".

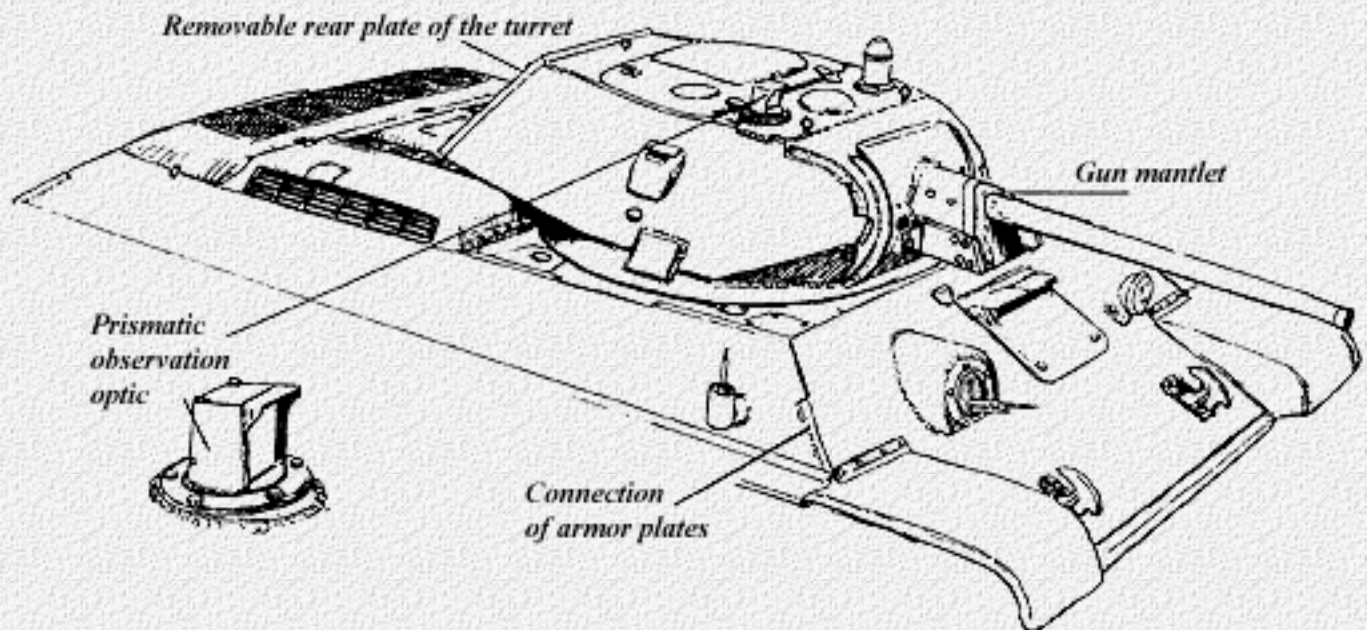
Such a position wasn't accidental. As is known, on July 9, 1940 the Soviet High

Command decided to form nine mechanised corps. By its organisation, each mechanised corps consisted of two tanks and one motorised division. Each tank division had 63 KV heavy tanks, 210 T-34 medium tanks and 102 light tanks (either BT or T-26 or both). Each motorised division had 275 light tanks (usually T-26). So the T-50 was intended to replace that large park of "outdated" vehicles. In February-March 1940, another 20 mechanised corps were formed using the same TO&E. Also many light tanks were needed to complete the tremendous number of Soviet rifle divisions (each rifle division had 16 tanks). So it is not too hard to calculate the entire number of medium tanks which should be produced to form all these corps: at least 4,620 medium tanks. At that time Soviet industry could produce only three T-34s.



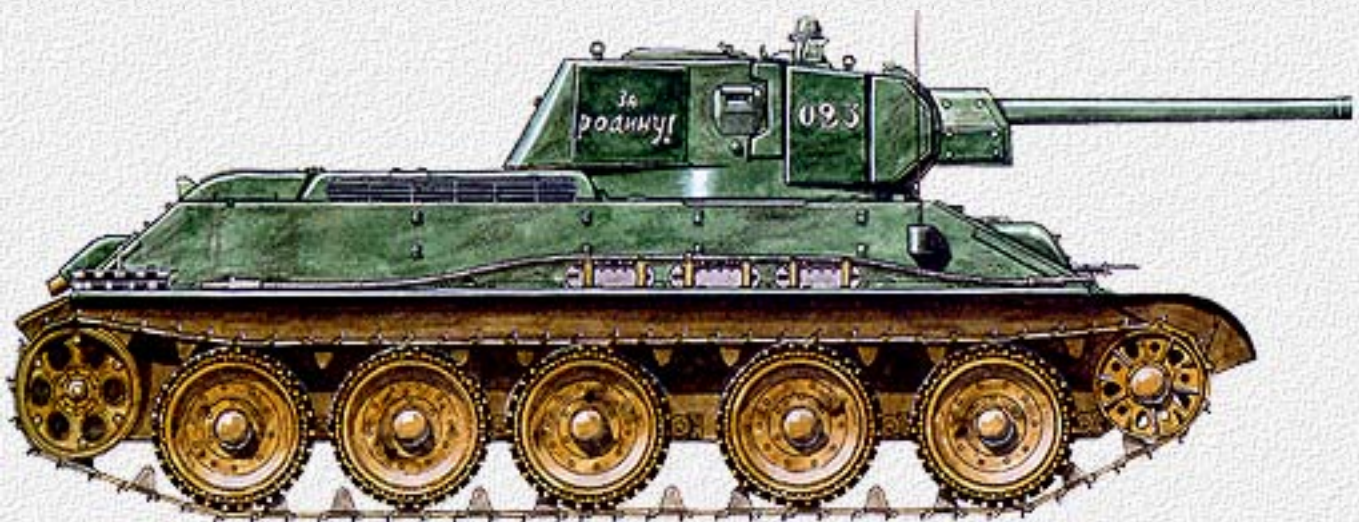
The T-34-76 Model 1941 of the 1st Guards Tank Brigade, Western Front, January 1942. (S.Zaloga)

Chief of the GABTU Y.N.Fedorenko and Chief of the GAU G.I.Kulik supported by the Commander of the Western Military District D.G.Pavlov, proposed to cease the T-34's production until the works on the T-34M were finished. The BT-7M's mass production should be resumed instead of the T-34's. For reasons which are unclear that proposal was rejected.



Features of the T-34-76 of the STZ Factory.

On June 25, 1941, the SNK USSR and the Central Committee of the Communist Party issued a decree "About increasing the manufacturing of KV, T-34 and T-50 tanks, artillery tractors and tank diesel engines in the III and IV quarters of 1941" in which the task to form a complex Tank Industry was given. On July 1, 1941, GKO issued another decree #GKO-1ss which required the "Krasnoye Sormovo" factory #112 to join the production of T-34s. The factory was required to mount an M-17T petrol engine. Mass production of that engine must have been set up in one of the GAZ's workshops, before that it had produced aircraft engines. A decision to mount a petrol engine instead of diesel was temporary and was connected to shortage of V-2 engines: by that time the only factory #75 produced them, all other suppliers were evacuated so they were simply unable to produce anything. By November 1941 mass production of the V-2 was set up in the STZ factory, but by then factory #75 was "on wheels" being evacuated to the East, so the total output of diesel engines wasn't increased.



The T-34-76E with additional armor plates welded on turret and frontal hull. *(M.Dmitriev)*

The production plan of the "Krasnoye Sormovo" supposed 750 "petrol" tanks to be produced until the end of the year. Unfortunately, it had completed only 173 tanks.

At the same time, the Factory #183 increased its output. Employees worked in two shifts (12 hours each). Production didn't cease even when the Germans bombed the factory.

TABLE 1. The manufacture of T-34s by the Factory #183 before evacuation.

Month	VII	VIII	IX	X
Production	250	250	250	30

As shown in the table above, the very last tanks were assembled when the factory was partially destroyed or evacuated. Ordered by decree #667/SGKO which was dated September 12, 1941, director of factory U.E.Maksarev started the evacuation process. On September 19, 1941, the first rail echelon had left Kharkov and set out for the Ural Mountains. Once in the new location, Nizhnij Tagil, a new factory was built in a very short time. It got its old number - #183. By December 1941, the new factory could produce 25 tanks using elements which were evacuated from Kharkov.



The T-34-76 Model 1941 of the Factory #183. *(E.Boldyrev)*

Looking back on autumn 1941, I can confirm that the Stalingradsky Tractor Factory (STZ) was, in essence, the single serious T-34 manufacturer. Now it is understandable why most of STZ's suppliers were set up in Stalingrad as well: mainly to reduce the T-34's cost price and to increase the output of the STZ as much as possible. Armour plates were manufactured by the "Krasniy Oktyabr" factory ("Red October").

Hulls were manufactured by the Stalingradsky Dockyard (factory

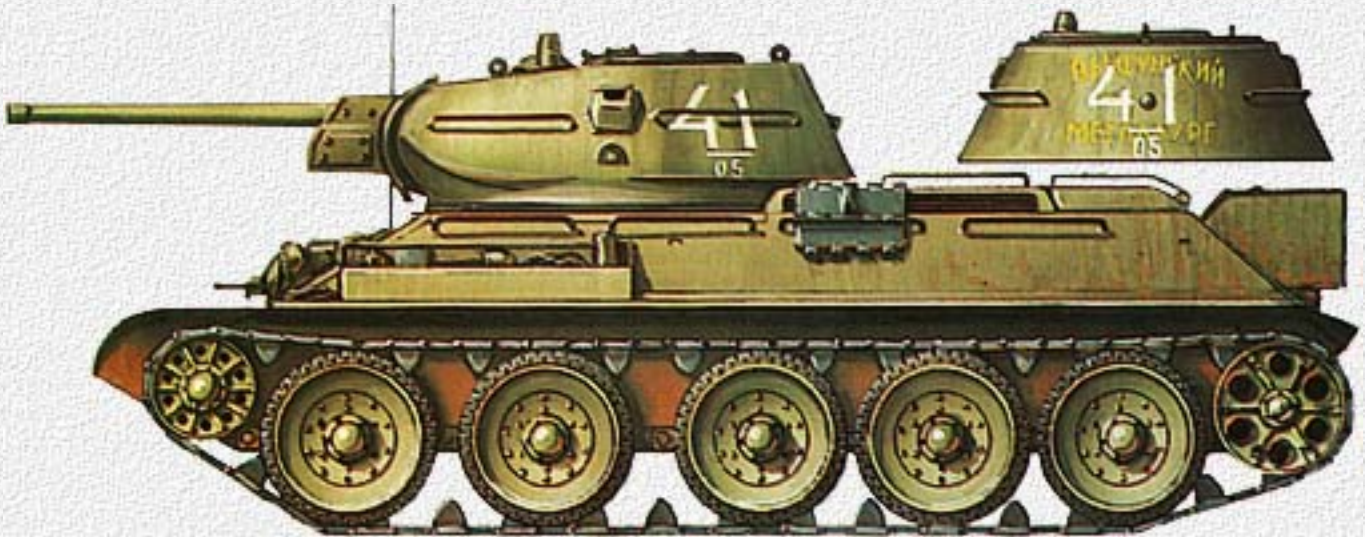
#264). In short, a full manufacturing industry was organised in one place, which is quite unusual for any complex industry.

In the first half of 1942, the T-34 was manufactured by three factories:

- #183 (Nizhnij Tagil);

- #112 "Krasnoye Sormovo" (Gorkiy); and
- the Stalingradsky Tractor Factory (Stalingrad).

Tanks of these factories have similar technical characteristics but their details differed significantly.



The T-34-76 Model 1941. South-Western Front. Summer 1942. (M.Dmitriev)



The new T-34-76 Model 1942 leaving the "Krasnoye Sormovo" Factory.

Since most suppliers were lost to the Germans, Soviet tank producers showed wonders of resourcefulness. For example, due to the loss of Dnepropetrovsk, the supply of gas-cylinders for engine emergency starting ceased. So the "Krasnoye Sormovo" used rejected cartridges from artillery shells.

In the STZ most of the welded details were replaced with cast because STZ had one of the best foundries in USSR. As the Germans advanced on Stalingrad,

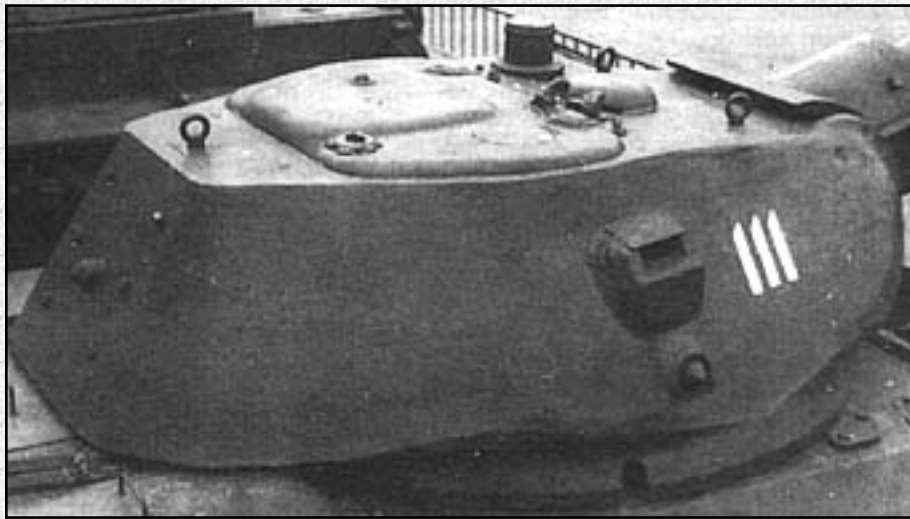
most of STZ's external supply lines had been cut off, rubber for instance. So the T-34s from the STZ had one specific feature: their road wheels didn't have a rubber tyre. Actually, by the end 1942, all other T-34 producers manufactured tanks with the same type of road wheels.

The factory in Stalingrad produced tanks until the Germans approached the factory's walls. Today we have an opportunity to imagine the conditions it worked in:

"From the beginning of artillery bombardment and air strikes on the factory's territory, the Workshop #5 had done the following:

1. manufactured 68 new tanks;
2. repaired 23 tanks;
3. furthermore, to help our Red Army to repair damaged tanks, a special brigade of skilled workers was formed; and
4. the Red Army was constantly supplied with number of spare parts.

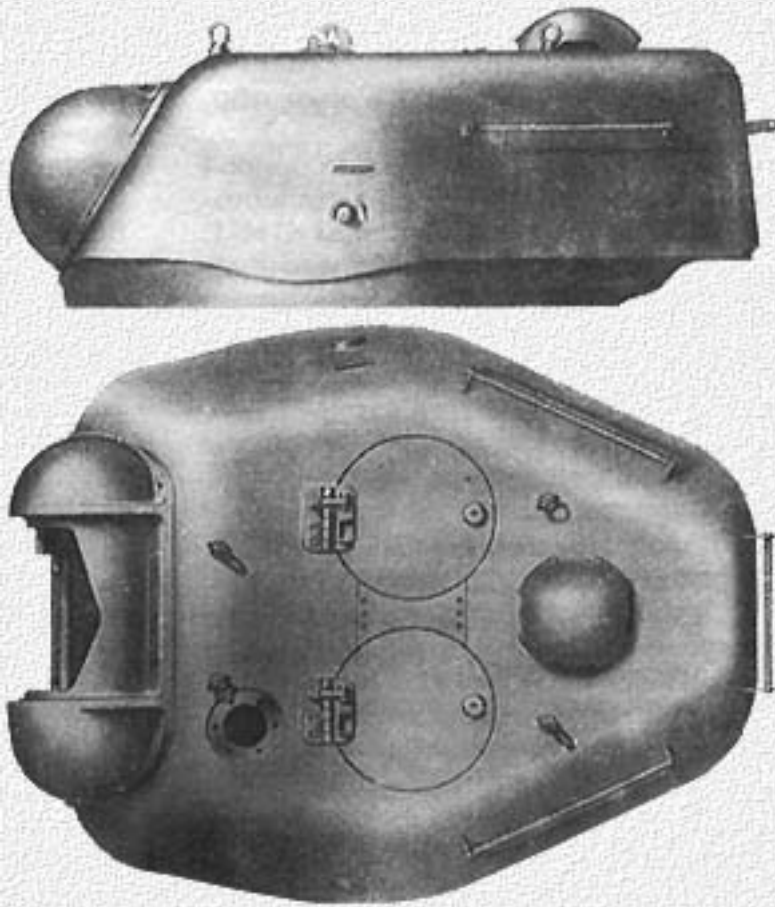
In that period, the Workshop #5 was hit by five high explosive bombs, 154 incendiary bombs and one shell. The roof was heavily damaged and perforated many times. The gas-holder was burned out."



The cast turret of the T-34-76 of the Factory # 183 (*M.Baryatinsky*)

From October 5, 1942, according to an NKTP order, all works in the STZ were cancelled and employees evacuated. The rest of factory walls were wiped out during hot battles in Stalingrad.

Striving to compensate for the evident loss of the STZ, in June 1942, GOKO ordered Kirovsky factory in Chelyabinsk (ChKZ) to begin mass production of the T-34. The first tanks were ready by August 22. In March 1944, production of the T-34 by the ChKZ factory was cancelled.



The technical drawing of the pressed turret of the "Uralmash" Factory.

Uralmash started mass production of hulls and turrets from April 1942 and supplied them to factory #183. In July 28, 1942, being ordered by GOKO's decree #2120, Uralmash then began mass production (assembling) of a whole T-34. The first tank was manufactured in September 1942. Constructors I.F.Varhushev and V.S.Arseniev developed a new pressed turret (see photo). From October 1942 to March 1944 Uralmash manufactured 2,050 of these turrets, and sent a significant number of those turrets to ChKZ. Uralmash did not manufacture the T-34 for very long. From August 1943, it switched to various SP guns which were based on the T-34's chassis.

In 1942, the Factory #174 was evacuated to Omsk, and launched T-34 mass production.

In August 1942, a new turret was developed. It had a hexagonal form, and all documents of that time named it "a turret of improved form". It was better than all previous turrets but still was very cramped. It had two rounded hatches instead of the previous "united" hatch. The turret also received an air ventilator that was mounted on the roof under the armoured cupola. Furthermore, the tank received an improved air filter "Cyclone", a 5-speed gearbox, and cylindrical external fuel tanks (up to four tanks, one of them always filled with oil, the rest were filled with fuel).

In summer 1943, the "Krasnoye Sormovo" had developed the new cast commander's cupola and began to mount it. Uralmash had proposed its own variant of a pressed commander's cupola, but it was rejected.



The cast hexagonal turret. Notice the unusual cast seam and lack of embrasures.
(M.Baryatinsky)

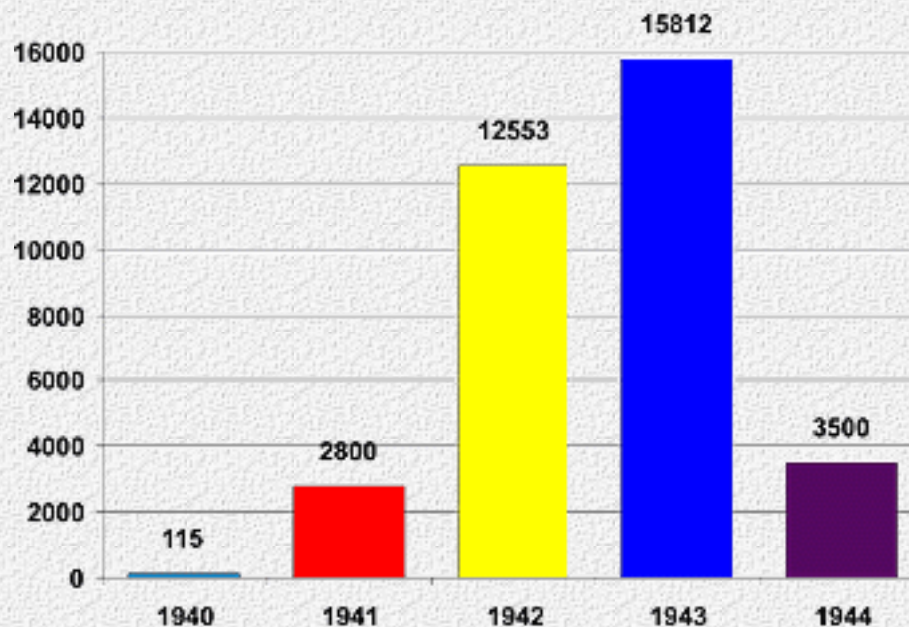
T-34-76 was produced until mid-1944. Then it was replaced with its upgunned variant - the T-34-85.

The "Krasnoye Sormovo" also developed and produced 68 T-34-76 protected with anti-HEAT shields (skirts) like those on most of the German tanks. It supposed these skirts would protect them from German HEAT ammunition, but it wasn't checked. In the very first battle common 75 mm AP rounds destroyed most of those tanks. The idea was considered as hopeless and was abandoned.



The T-34-76 Model 1942. South-Western Front, Kharkov area. March 1942. (M.Dmitriev)

The total production of the T-34-76

**TABLE 2. The full list of the T-34-76 manufacturers**

Designation	Russian name	English transcription	City	Notes
# 183 KhPZ	Kharkovsky Parovozostroitelny Zavod	Kharkov Steam-Engine Plant	Kharkov	Before autumn 1941
# 183 UVZ	Uralsky Vagonostroitelny Zavod	Ural Rail-Car Plant	Nizhnij Tagil	There is KhPZ after evacuation in October 1941.
STZ	Stalingradsky Tractorny Zavod	Stalingrad Tractor Plant	Stalingrad	-
# 112	"Krasnoye Sormovo"	"Red Sormovo"	Gorkij (today - Nizhnij Nivgorod)	-
UTZM	Uralsky Zavod Tyazhelogo Machinostroyeniya	Ural Plant of Heavy Machine-Building	Sverdlovsk	-
ChKZ	Chelyabinsky Kirovsky Zavod	Kirov's Plant in Chelyabinsk	Chelyabinsk	There is Kirov's Plant after evacuation from Leningrad
# 174	-	-	Omsk	-

This table was made by M.Svirin.

REFERENCES:

[The blueprint of the T-34-76 Model 1940](#)

[The blueprint of the T-34-76 Model 1942](#)

[The blueprint of the T-34-76 Model 1942 with the hexagonal turret](#)

[The interior of the T-34-76](#)

[An Evaluation of the T-34 and KV tanks by American engineers](#)

[Specification of Soviet tanks](#)

[Specifications of Soviet tank guns](#)

Sources:

"The T-34 tank. Operational manual", Voenizdat, 1941;

"The T-34 tank. Handbook", Voenizdat, 1944;

"About manufacturing T-34 tanks in 1940" AP RF. F.93. Document collection;

Bronekollektsiya #3, 1999;

I.Shmelev "The T-34", Technics and Armament #11-12, 1998;

J.Magnuski "Wozy bojowe", LWP, Warsawa, 1985;

"Soviet tanks in combat 1941-1945. The T-28, T-34, T-34-85 and T-44", Concord publ. company;

S.Zaloga, J.Grandsen "T-34 in action";

Cover picture - A.Aksenov

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Medium Tanks of the T-34 Series

◀ [MAIN MENU](#) [SOLDIERS AT](#)

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The T-34 in Action

The first mass production T-34 came to the tank formations of the Red Army late autumn 1940. However, the planned fighting training has begun only spring 1941. Unfortunately, much reorganization of the tank troops that were conducted last two pre-war years influenced negatively on the mastering the use of the new tanks.

As known, on November 21, 1939, Supreme Military Council of the Red Army decided to disband all existing (four) tank corps that existed in the Red Army by that time. Tanks brigades and mechanized divisions were created instead of them. Less then a year later the Ministry of the Defense makes diametrically opposite decision, and starts



The unrecognized tank unit is deployed in the forest. Probably May 1942. (Sovfoto)

forming nine mechanized corps. Finally, in February-March 1941, the deployment of 20 more mechanized corps has begun.

Unfortunately, army had neither people nor machinery to do it. Nevertheless, the last pre-war year endless rearrangements were going on: some formations were deploying, others were eliminated, units of other types of forces were being hand over to the tank troops, etc. All of this was accompanied by shifting of units

and formations from one place of distribution to others. Thus, by the beginning of the Great Patriotic War only those 9 mechanized corps which were created during summer 1940 were relatively efficient. But even in them the organization of the fighting training in some cases left much to be desired. In great use was the faulty system of the saving the moto-resource of the tanks, at which crews were training on worn-out machinery of the fighting-training depot. And the new, better and mostly different from earlier generation machinery was kept in hangars. It was no use of BT-2 tanks for training crews of BT-7 tanks, but it was non-sense when outdated T-26s were used to train drivers for newest T-34 tanks.

As a result, crews did not master most of the received T-34s. Mechanics knew the system of the tanks very poorly. This was one of the reasons for high percentage of non-fighting losses of the KVs and T-34s during first months of the war.

There are many discrepancy of the amount of T-34 tanks in the Red Army by the beginning of the war. More recently we find the information that by June 22, 1941, Soviet factories manufactured 1225 T-34 tanks. This is not quite right. This number of tanks was calculated during 1940 (total 115) and first six months of 1941 (total 1110), which ended June 30, not June 22. Of this amount of the



A T-34s with additional armor fitted by factory #27 are going to front. Leningrad area. 1942.

(RGAKFD)

machinery 97 tanks were accepted in 1940 and 1129 in 1941. After adding we get 1226 tanks (the difference between manufactured and accepted in one tank is permissible).

There is also no common opinion on the amount of T-34, which were in service in the frontier (western) military districts. The most recent is the number of 967. However, the amount of tanks (and not only tanks) of once or other type on the exact date of June 22 no one would count. The reports on the amount of tanks in the troops were released on the first day of each month. All datas we could find out are collected [here](#).

By June 1, 194, Western military districts (Leningrad, Baltic special, Western special, Kiev special, and Odessa Special) had 832 tanks. 68 T-34s more were in the rear districts (Moscow, Kharkov, Orel). The difference between 967 and 832 is 135 tanks (some sources say 138), which could be received by the frontier districts during June.

Unfortunately, we cannot talk about the exact amount of T-34 tanks in mechanized corps of the districts. We have only parts of information. The South-Western Front was deployed on the base of the Kiev Special Military District. Thus, we can presume that the commander of the tank troops of the front composed the table in the beginning of July 1941 in retrospect, probably by memory.



As to the Baltic Special Military District, two mechanized corps - 3rd and 12th - were distributed there. T-34s were only in 3rd. By January 1, 1941, the amount of them was 50. As it was planned, the 3rd Corps was to receive 103 T-34s more. We still don't know the amount of the received tanks by June 22, if the corps received any. Mechanized corps of the

This T-34 model 1942 is equipped with a loud-speaker for propaganda actions. *(James Lul)*

Eight T-34s were at Leningrad Tanker's Training Courses.

Thus, we can't give the exact amount of T-34 in the frontier military districts. 967 can be considered the closest number to the truth. Is it a little or a lot?

By the beginning of the war Western frontier districts had 19 mechanized corps, including 10,394 tanks of all kinds (other sources state - 11,000). Taking in consideration tanks in some rifle, cavalry, and separate tank units this amount increases to 12,782 tanks (by information at June 1st). T-34 tanks were only 7.5% of this amount.



The (probably) damaged T-34. Winter 1942-43. *(Federal Archive)*

Leningrad Military District - the 1st and the 10th - had no T-34 tanks.

However, on June 22, 1941, Germany with its allies deployed 3,899 tanks and assault guns including the Reserve of Supreme commandment of Wehrmacht - 2nd and 5th tank divisions (originally didn't participate in fights) - against our Western frontier. Only 1,404 of them were medium tanks Pz-III and Pz-IV, so 967 T-34 tanks (we should consider also 504 heavy KV) were supposed to be formidable force.

Unfortunately, we couldn't use it in full. Unsuccessful location, shortage of people and equipment, lack of crews' training, reserve parts for tanks and evacuation vehicles significantly reduced fighting efficiency of the Soviet mechanized corps. During long marches (most of the mechanized corps formations were deployed pretty far from the borderline) not only old tanks but also new T-34s and KVs were breaking. Gearboxes and friction clutches were breaking because of inexperienced drivers. The most of breakage couldn't be fixed on the spot. And the provision of the troops with evacuating vehicles was too low. Mechanized corps were provided with tractors in average of 44% including trucks that were used as tractors for artillery but were useless for tanks towing. Even where tractors were available not always they could help.



A pair of STZ-65 tractors tow a T-34 model 1942 out of a bog near Sukhinichi, south west of Kaluga. The second tractor is out of view to the left, though the tow cable can be seen. This tank was attached to a tank unit of the 50th Army, the westernmost Red Army force facing the German Army Group Center in the summer of 1942. (Federal Archive)

Agricultural tractors "Stalinets S-60" and "Stalinets S-65" with draught of 4 tons manufactured in Chelyabinsk were basic evacuation vehicles of the tank units of the Red Army. They could manage towing T-26 and BT, but when trying to move 26-ton T-34 they were literally bristling up. It required two or even three tractors, which was not possible all the time. More than a half of all T-34s (and heavy KVs also) of the frontier districts were located in Kiev Special Military District, at the time when the main impact was at Western Special Military District.

However, the most dramatic

events of the first days of the war was related to tank battles in the triangle of Rovno-Lutsk-Brody took place on the South-Western front and still undeservedly poor described in literature.

By the end of June 24, on the Rovno direction, on the junction of the 5th and 6th armies a gap of 50 kilometers occurred, where the formations of the 1st German Tank Group of the general E.Kleist (799 tanks) has directed. The threat of break in of the German troops and embrace of the basic troops of the South-Western Front from North was created. For liquidation of this threat and rout of the enemy a counter-offensive by forces of 8th, 9th, 15th, and 19th mechanized corps has been put on flanks of broken-through German troops on June 26-29.



The lieutenant's Shiukin evacuation vehicle (left) being prepared for towing the damaged T-34. July 1943. (RGAKFD)

D.I.Ryabuishev) and the 15th Mechanized Corps (the commander - major-general I.I.Karpezo) were attacking on Dubno from the South and the North-West. We should emphasize that by the beginning of the war this corps had 286, 279, 858, and 733 tanks correspondingly, so 2156 at all! 181 of them were T-34s and 140 were KVs. Up to 50% of this amount didn't participate in the counter-offensive, because of many different reasons. A part of them was lost, a part broke down while going to starting positions, others just didn't come on time: the 7th Motorised Division of the 8th Mechanized Corps, for example, was still marching at that time. Nevertheless, at least 1000 tanks were ready to attack the enemy. The forces were distributed unevenly: 700 tanks were attacking from the South and around 300 tanks - from the North. And almost all of the T-34s and KVs were in the North formation.



The evacuation vehicle being is towing the damaged T-34 under the enemy fire. Kursk. July 1943. (RGAKFD)

The 9th Mechanized Corps (the commander - major-general K.K.Rokossovsky) and the 19th Mechanized Corps (the commander - general N.V.Feklenko), accomplished more than 200 kilometers march under continuous influence of the enemy's aircraft and now were East of Lutsk and were supposed to attack on Dubno from the North.

The 8th Mechanized Corps (the commander - major-general

The counter-attack of our troops has begun on June 26 and transformed into a counter-offensive with formations of the 1st Tank Group of the enemy. The especially strong defeat was put on the 48th German Motorised Corps, the 11th Tank Division was completely routed. However, we couldn't finish the operation with encirclement of the enemy because of lack of the precisely adjusted communication and co-operation

between attacking corps and their higher staffs.

He's what V.S.Arkipov, the commander of the reconnaissance battalion of the 43rd Division of the 19th Mechanized Corps wrote in his memoirs:

"Faint radio communication with long intervals was the reason for late information from the frontline to the higher staffs. That's why the decisions made by staffs and passed to the frontline most of the time were late and didn't answer to the changed situation. For example, evening of June 26, our division smashed the right flank of the 11th German Tank Division and routed one of its tank regiments and got to Dubno. We didn't know that the 8th Mechanized Corps of the general D.I.Ryabushev was successfully moving towards us from the South, fighting formations of the 48th Motorised Corps. Same situation has repeated next day, when all three corps - 36th Rifle, 8th and 19th Mechanized - again were attacking on Dubno direction. And again our neighbors, the 36th Rifle Division and us got near Dubno, but we didn't know that 34th Tank Division of the 8th Mechanized Corps under commandment of colonel I.V.Vasiliev was already in the city. Thus, July 26-27 Soviet tank wedges twice ran deeply - up to 30 kilometers - into both flanks of German motorised corps.

However, the absence of the connection between these units and mutual lack of information didn't let to finish the attack and encircle the 48th Corps between Brody and Dubno. By the enemy's troops we could see that this encirclement was imminent. Evening of June 26, when we were chasing Germans to Dubno, it was not an organized retreat, but panic escape of the enemy. Units of the 11th Tank Division mixed up and flee in panic. It showed also in fact that besides hundreds of prisoners we captured many tanks and armored personnel carriers

and around 100 motorcycles left in good condition by crews. Approaching Dubno, at twilight, tankers of the 86th Regiment saw eight German tanks at the end of their convoy, most probably Germans mistook our tanks for German. The crews surrounded with their tanks after the first request of our tankers. Prisoners usually were saying that they're not members of the National-Socialist party (NSDAP), and were gladly testifying. This kind of psychological condition of German troops - depression and panic - I've seen again only after the Battle of Stalingrad and Battle of Kursk. Hence it follows that counter-offensive of the mechanized corps of the South-Western Front started on the 5th day of the was had hard moral effect on Germans."

But according to the note dated June 29 in the diary of the commander of the General Staff of Wehrmacht, colonel-general F.Galder German troops were impacted not only morally:

"At the right flank of the 1st Tank Group the 8th Russian Tank Corps broke deeply into our position, and got to the rear of our 11th Tank Division. This enemy's breakthrough caused bad confusion in our rear around Brody and Dubno. The enemy threatens Dubno front South-West, and its very undesirable to lose Dubno, because of storage of ammunition and properties there."

By September 4, 1941, losses of the 1st German Tank Army were 408 tanks, 186 of them were irrevocable. This number could increase if 4th Mechanized Corps (commander - major-general A.A.Vlasov), which had 313 T-34s and 101 KVs, joined the counter-offensive. But this corps was acting Southern, in the area of the 6th Army. Our losses were also great - after three days of the operation all four mechanized corps were left almost with no tanks.

The amount of losses of the Red Army in period of June 22-July 9 were 11,712 tanks, among them almost all T-34s. And all of the losses were irrevocable, because it wasn't



The damaged and stuck T-34 of "Krasnoye Sormovo" Factory. The "Viksunskiy metallurg" slogan is painted at the rear of the turret. *(Federal Archive)*

possible to fix the broken tanks - the battlefields were left for Germans.

Huge casualties and machinery losses, sluggishness and inflexibility in the management of the troops led to transfer from corps to smaller formations - brigades, regiments, and battalions.

Brigades of different organization were participating in Battle for Moscow. For example, the 8th Tank Brigade had regimental structure it had 22 T-34s, 7 KVs,

and 32 light tanks. The 4th Tank Brigade (from November 11, 1941 - the 1st Guards Tank Division) was formed in September 1941, in Stalingrad by battalion scheme organization, including 49 tanks (16 of them - T-34s manufactured by STZ). This formation with commander M.E.Katukov was successfully acting around Orel and Mtsensk, fighting against the 2nd German Tank Group of the general H.Guderian, and after 360-kilometer march by itself, got into fight on the Volokolamsk direction. Speaking of the 1st Guards Brigade we should mention the senior-lieutenant Dmitriy Fedorovich Lavrinenko. He fought 28 battles. Three T-34 tanks of his were burned down. At the day of his death for the village Goruny (suburb of Volokolamsk) on December 17, 1941, Lavrinenko shot his 52nd tank of the enemy and became one the most effective Soviet tanker of the WWII (another tank ace was Guards Captain Konstanin Samokhin, during five months he was credited with 69 German tanks, 13 other AFVs, 82 guns, 117 motor vehicles. He was killed on the February 23, 1942). Its astonishing and insulting that Dmitriy Lavrinenko wasn't rewarded. Even after his death.



The T-34-76 model 1942 of the major P.Ya.Roy. 25th Guards Tank Regiment, 2nd Guards Mechanized Corps. July 1943.

In the defense of Moscow T-34-57 tanks-hunters have participated. The 21st Tank Brigade that was acting on Klin direction had about 10 of these tanks. In just two days - October 15 and 16 - the brigade, acting from ambushes, shot 18 enemy's tanks.



A well camouflaged T-34 guarding the outskirts of the Ponuri rail station. Kursk. July 1943. (RGAKFD)

However, tank units of the Red Army, which were defending Moscow didn't have many T-34 tanks. Light tanks were prevailing, old ones as well as new T-60s. Let's say, that at the beginning of October 1941, the Western Front had 483 tanks, only 45 of which were T-34s and KVs. By the end of the year the amount of T-34 in the troops increased a little, but didn't exceed 25-30% of the whole amount of tanks.

The same situation was in 1942 as

well, despite increase in manufacturing of T-34. For example, tank troops of the 61st Army by the beginning of Bolkhov attacking operation in June 1942, had 334 tanks of 7 different types. Only 67 of them (20%) were T-34.

However there is very interesting to see what the Germans thought about capabilities of the T-34. On 26 May 1942 the General der Schnellen Truppen beim Oberkommando des Heeres distributed the following "Instructions to units on the Eastern Front for Combating the Russian T-34 Tank with our Panzers":

"Characteristics of the T34.

The T-34 is faster, more maneuverable, has better cross-country mobility than our Pz.Kpfw.III and IV. Its armor is stronger. The penetrating ability of its 7.62 cm cannon is superior to our 5 cm KwK. and the 7.5 cm KwK40. The favorable form of sloping all of the armor plates aids in causing the shells to skid off.

Combating the T-34 with the 5 cm KwK tank gun is possible only at short ranges from the flank or rear, where it is important to achieve a hit as perpendicular to the surface as possible. Hits on the turret ring, even with high-explosive shells or machine gun bullets, usually result in jamming the turret. In addition, armor-piercing shells fired at close range that hit the gun mantle result in penetrations and breaking open the weld seams. The T-34 can be penetrated at ranges up to 1000 metres with the 7.5 cm PaK 40 as well as the 7.5 cm Hohlgranate (hollow-charge shells)

Russian Tank Tactics.

In defense and covering a retreat, the T-34 with the turret at six o'clock is often dug in on a commanding height along a road or on the edge of woods or villages. Then after surprisingly opening fire from ambush, the T-34 can be driven out of the concealed position still under cover.

In correctly recognizing his technical superiority in weapons, the T-34 already opens fire on German Panzers at ranges from 1200 to 1800 metres. Because the T-34 is faster than the German Panzers, he can choose the range for a firefight.

Our Panzer Tactics.

Because the 5 cm KwK can only be expected to penetrate the flanks of the T34 at short range, the following tactics have proven been to be correct in combating them:

- a. Attract and tie down the opponent frontally by having a Pz.Kpfw.III take up the firefight. Choose a hull down position or drive in a zig-zag course to make it difficult for the opponent to hit the target.
- b. At the same time, utilizing all available cover, two other Pz.Kpfw.IIIs attempt to circumvent the T34 to the right or left in order to gain a position in the flank or in the rear and knock him out at short range with PzGr40 fired at the hull or rear.
- c. If a Pz.Kpfw.IV is available among our own Panzers, it is to be employed in front of the opponent. The use of Nebelgranaten (smoke shells) can blind the T-34 or aid the other Panzers in closing in. It is also possible that the opponent will think that the smoke is poison gas and break off the action.

When encountering numerically superior enemy tanks (T-34 and KV), success has always resulted when our Panzer unit builds a fire front and overwhelms the enemy with fire. Even when no penetrations can be achieved, the enemy, impressed by the accuracy and rate of fire of the German Panzers, almost always breaks off the action.

The T-34 became the main battle tank of the Soviet tank troops only by 1943. It's shown

on the example of the Center and Voronezh Fronts right before the Battle of Kursk.

Table 1. Distribution of the various tanks by July 1943.

Front	Tank types			Total
	KV	T-34	T-60 and T-70	
Central Front	70	924	587	1581
Voronezh Front	105	1109	463	1677
Total	175	2033	1050	3258

Thus, among all tanks of two fronts in July 1943, T-34s were 62% in total and stood the hardest [Battle of Kursk](#), including famous Prokhorovka.

Evening of July 10, 1943 the commandment of the Voronezh Front received order of Stavka to commit the counter-attack on German troops attacking in Prokhorovka direction.



The rare photo of T-34s being prepared for antiaircraft shooting. 1943. (I.Shmelev)

For this, the 5th Guards Army of the Lt.Gen. Zhadov and the 5th Guards Tank Army of the Lt.Gen. Rotmistrov were transferred from reserve Steppe Front to the Voronezh Front. The 5th Guards Tank Army was the first army of the uniform compound. The formation of the army has begun February 10, 1942 and by the beginning of the Battle of Kursk was stated around Ostrozhsk (Voronezh region). The 18th Tank Corps, the

29th Tank Corps, and the 5th Guards Mechanized Corps were parts of it.

11.00 PM July 6, the army received order to concentrate on the right shore of the Oskol river. 1.15 PM the advanced group of the army began moving, and in 45 minutes the main forces went on. It's necessary to mention the immaculate organization of the march. Head traffic was prohibited on all of the routes of the convoys. Army was moving 24 hours a day, with short stops for refueling. The march was surely covered with antiaircraft artillery and aircraft, and thanks to all of this, the march was unnoticed by the enemy's reconnaissance. Army has moved 330-380 kilometers in three days. And there was almost no broken machinery, which shows increased reliability of tanks as well as competent maintenance of the machinery.

On July 9, the 5th Guards Tank Army concentrated around Prokhorovka. Supposedly,

the army with addition of two tank corps (the 2nd and the 2nd Guard) would attack on Germans at 10.00 AM together with the 5th Guards Army and the 5th Guards Tank Army, and the 1st Tank Army, and would destroy the broken-in enemy's group on the Oboyan direction, not letting it to retreat South. However, preparation of the counter-offensive, which began on June 11, was wrecked by the Germans, who attacked twice on our defense: first - in Oboyan direction, and then - on Prokhorovka. As a result of partial retreat of our troops artillery, which had a major role in counter-offensive, had losses, at the positions of deployment as well as in movements to the frontline.



A combined training T-34s and lend-lease Tetrarchs. Caucasus, autumn 1942. *(Sovfoto)*

Early morning of June 12, because of German attack on the 69th Army, a threat for the left flank of the deploying on the South-West of Prokhorovka main forces of the 5th Tank Army has occurred. The 6th and the 19th Tank Divisions (about 200 tanks) started attacking from the area of Melichove to Rzhavets.

Thus, two brigades of the 5th Guards Tank Army (tank, motorcycle, antitank, and howitzer

regiments) were relocated to the 69th Army frontline. All those troops, were united in a group with commander - major-general K.G.Trufanov (about 100 tanks including T-34s) not only stopped moving North enemy, but threw him back to the starting point.

8.30 AM July 12, the main forces of the German troops, including the SS divisions "Leibstandarte Adolf Hitler", "Das Reich", and "Totenkopf", which had up to 500 tanks and assault guns, including 42 Tigers started attacking in Prokhorovka direction. At the same time, after 15-min artillery mission the German group was attacked by the main forces of the 5th Guards Tank Army, which led to deployment of the oncoming tank battle, in which about 200 tanks from both sides fought, and the enemy had more medium and heavy tanks than we did. This battle, in defiance of stereotypes, didn't take place at one single field like the Borodino or the Verdun, but was on front up to 35 kilometers long, and appeared in many single tank battles.



The T-34s before the attack. Stalingradsky Front. Autumn 1942. *(I.Moshansky)*

Despite suddenness of the attack, Soviet tanks were net by concentrated fire of the German antitank artillery and assault guns. However, the 18th Tank Corps on a high speed broke into the state farm "Oktyabrskiy" and, with huge losses, captured it. With moving forward the corps met enemy's tank group which had 15 heavy tanks Tiger, fought it for few hours, and by 6.00 PM turned to defense.

The 29th Tank Corps had maneuver fight for the height 252.5 with tanks of LSSAH Division, but after 4.00 PM was driven back by tanks of the "Totenkopf" Division, and after dark also turned to defense.

The 2nd Guards Tank Corps, that was attacking on Kalinin village, at 2.30 PM suddenly met the "Das Reich" Motorised Division SS, which drove it back to the starting point. The 2nd Tank Corps, that was covering junction between the 2nd Guards Tank Corps and the 29th Tank Corps moved back German units a bit, but came under fire of the 2nd echelon's assault guns and antitank guns, sustained losses and was stopped.



The battlefield near the Akhtyrka. Kursk. July 1943. *(M.Svirin)*

Despite the fact that the 5th Guards Tank Army, which was acting in line of 17-19 kilometers, could reach density of the attacking troops up to 45 tanks per 1 kilometer, it couldn't fulfill its mission. Losses of the army, excluding group of general Trufanov, were 328 tanks and self-propelled guns, and together with the attached formations reached 60% of the starting amount.

German troops lost 320 tanks only on the day of July 12, according to the report of the commander of the Voronezh Front. German statistics lowers this number to 218, and even to 190 tanks. Anyhow, by the end of July 12, the Germans left the battlefield in Prokhorovka, and by July 16 began organized retreating. Incidentally, "Citadel" operation has failed.

On July 12, the troops of the Bryansk Front started attacking. On July 18, a fresh tank group - the 3rd Guards Tank Army (475 T-34s and 224 T-70s) - got into the battle.



The T-34 model 1941. Notice the smoke discharging battery mount on the right side of the tank. Winter 1942. (RGAKFD)

On Belgorod-Kharkov direction the Soviet troops reached the starting line that they had before German attack by July 23. On August 3, a counter-offensive of the Voronezh and Steppe Fronts has begun. That time tank replenished formations. Thus, the 1st Tank Army had 549 tanks (412 of them were T-34s). After all T-34-76 tanks were used in mass in the Battle of Kursk and in all following

operations in 1943.

However, we should mention that their main opponents were not tanks as many history buffs thought, but German antitank artillery. German antitank and tank guns caused 90% of our tank losses in 1943-1945. Unfortunately, modern tank "lovers" ignore those facts and keep comparing T-34 to Panthers and Tigers. Ridiculous, and nothing more!

Table 2. Losses of the T-34s depending of the German gun calibres.

Period	Losses, %								
	20 mm	37 mm	50 mm L42	50 mm L60	75 mm	88 mm	105 mm	128 mm	Unknown
Prior September 1942	4.7	10	7.5	54.3	10.1	3.4	2.9	0	7.1
Stalingrad operation, 1942-1943	0	0	25.6	26.5	12.1	7.8	0	0	28
Kursk Battle, the Central Front, 1943	0	0	10.5	23	40.5	26	0	0	0

From the table we can see clearly, that in 1943 66,5% of T-34s were shot by 75-mm and 88-mm tank guns (Pz-IV, Pz-V, Pz-VI) and antitank guns. At the beginning of the war the T-34 had advantage over the enemy's tanks in distance, for its better gun could hit any

German tank from a distance up to 1,000 metres. While, the range of firing of enemy tanks usually didn't exceed 300 metres. In 1943, with increase in armor thickness of the German tanks, distance of the effective fire on them decreased and didn't exceed 500 metres. At the same time 75- and 88-millimeter long barreled German guns could hit the T-34 on the ranges of 900 and 1,500 metres relatively.

Thus, by the end of 1943, the T-34 was not longer suitable for the given tasks. After detailed examination of the latest war experience, a special commission stated **"the T-34 is no longer match to the current war conditions. It become permeable for Germans guns at all ranges"**. The modernisation has been needed. As a result the T-34-85 was developed. As to the T-34-76, since 1944 the amount of them in the active army was decreasing continuously. The rest of the tanks was still acting in all operations of the Red Army in 1944-1945, including Berlin operation, but in general it was taken out of the first line, and used in rear units as training tanks. T-34s were in some units of the Red Army up to the early 1950s.



A pair of T-34s from the 2nd Tank Regiment of the 1st Polish Tank Brigade. 1943. (*Federal Archive*)

Besides the Red Army, during WWII T-34 tanks served in the People's Army of Poland, People-Liberating army of Yugoslavia, and the Czech Corps.

In June 1943-January 1945, the Polish Army received 118 T-34 tanks, mainly from the factory "Krasnoe Soromovo" and from repair factories. By the end of the fighting in Europe all Polish units had 62 tanks of this type. Some tanks were re-equipped into armored evacuation vehicles and used even in 1950s.

We cannot give the exact amount of tanks received by the People-Liberating Army of Yugoslavia and by the Czech Corps. Most probably we can talk about few dozens.

The Wehrmacht used captured T-34s also. For example, the "Das Reich" Motorised Division had 25 T-34s at the time of the attack on Kursk, summer 1943. Some of them were equipped with German commander turrets. The Germans reconstructed some T-34s into self-propelled antiaircraft guns and evacuation vehicles.

The amount of T-34 in the Finnish Army didn't exceed 9 vehicles, seven of which served until 1960s.

Some T-34 were used by the Hungarian and the Romanian Armies, as well as [the Russian Liberating Army](#) (ROA) of the general A.A.Vlasov.

REFERENCES:

[Tanks of the 1st division of ROA](#)

[Quantity and condition of tanks of the Red Army](#)

[Specifications of Soviet tank guns](#)

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Sources:
Bronekolleksiya #3, 1999;
I.Shmelev "The T-34", Technics and Armament #11-12, 1998;
Thomas I.Jentz "Panzer Truppen", Shiffer Military History, Atglen, PA;
J.Magnuski "Wozy bojowe", LWP, Warsawa, 1985;
"Soviet tanks in combat 1941-1945. The T-28, T-34, T-34-85 and T-44", Concord publ. company;
S.Zaloga, J.Grandsen "T-34 in action";
Cover picture - Don Geer

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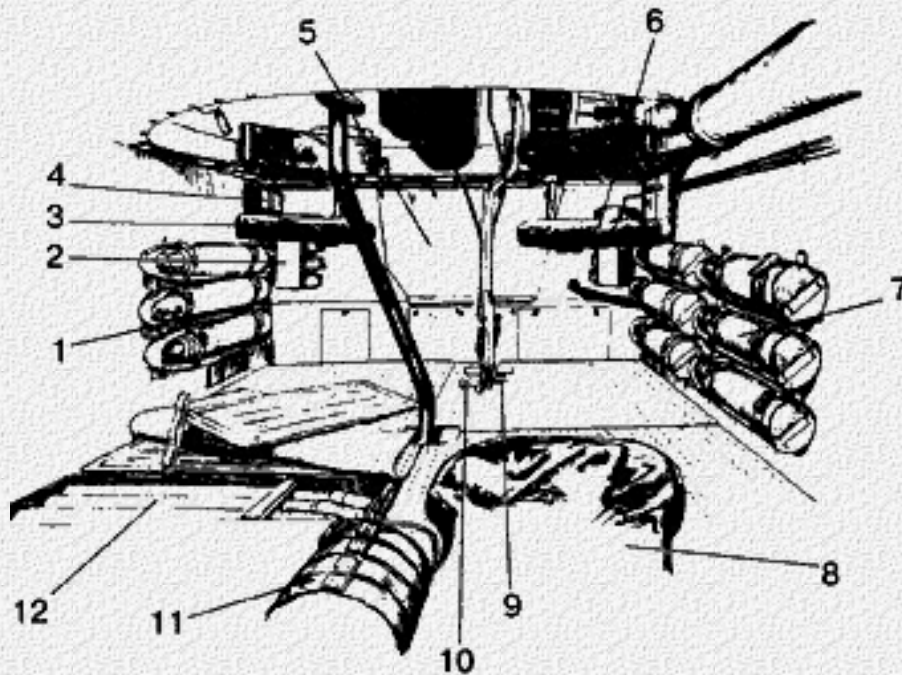
The T-34 Medium Tank

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Construction Features

The T-34 medium tank was of a classical layout with rear transmission. The hull was divided in the driver's compartment, fighting compartment, engine bay, and transmission housing.



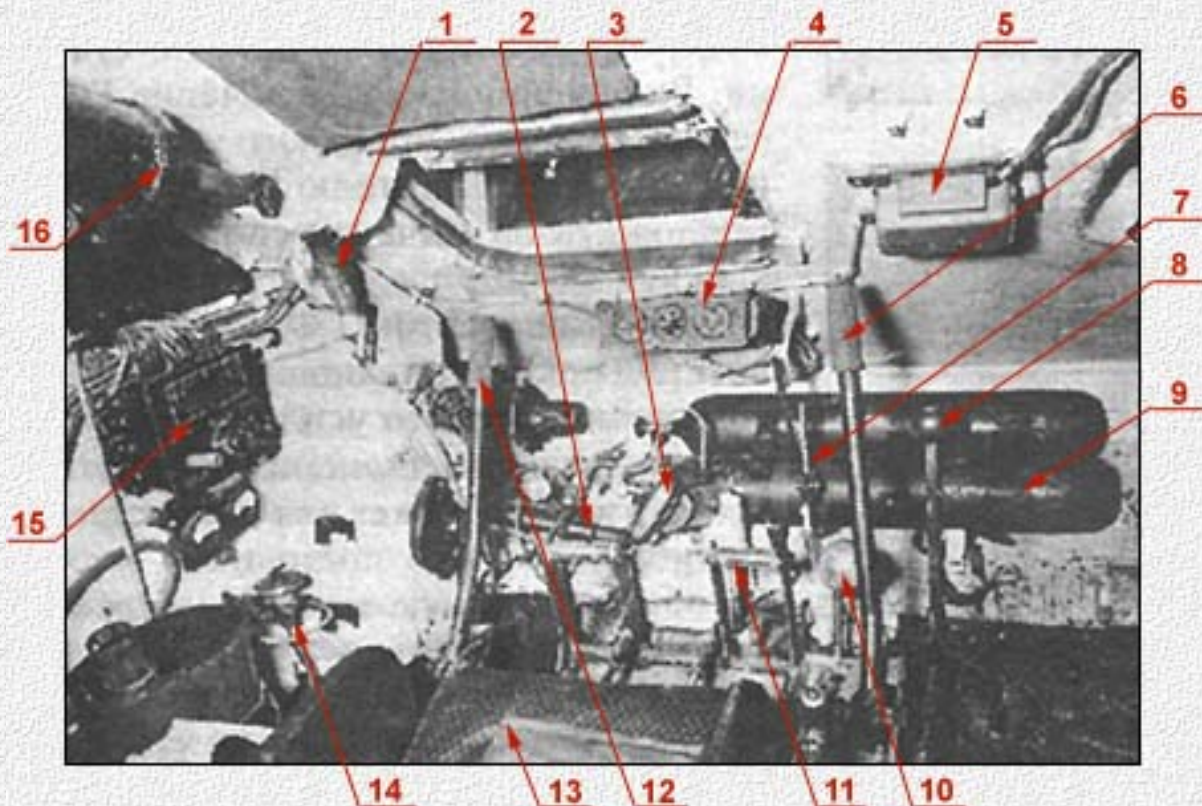
The battle compartment view.

- | | |
|---|----------------------------------|
| 1. Three rounds on the right side; | 7. Six rounds on the left side; |
| 2. Magazines for the coaxial MG; | 8. The driver's seat; |
| 3. The loader's seat; | 9. The trigger pedal of the gun; |
| 4. Reserve storage of the optic prisms; | 10. The trigger pedal of the MG; |
| 5. The bulkhead; | 11. Magazines for the bow MG; |
| 6. The commander's seat; | 12. Ammo boxes on the floor. |

The steering unit was placed in the front hull, with a driver and a radio operator's station, operating controls, devices and gauges, the bow 7.62 mm DT machine-gun in a spherical mount, some ammunition, radio (initially on command tanks only), observation sights, a pair of oxygen bottles for emergency starting of the engine, some spares, instruments and additional equipment.

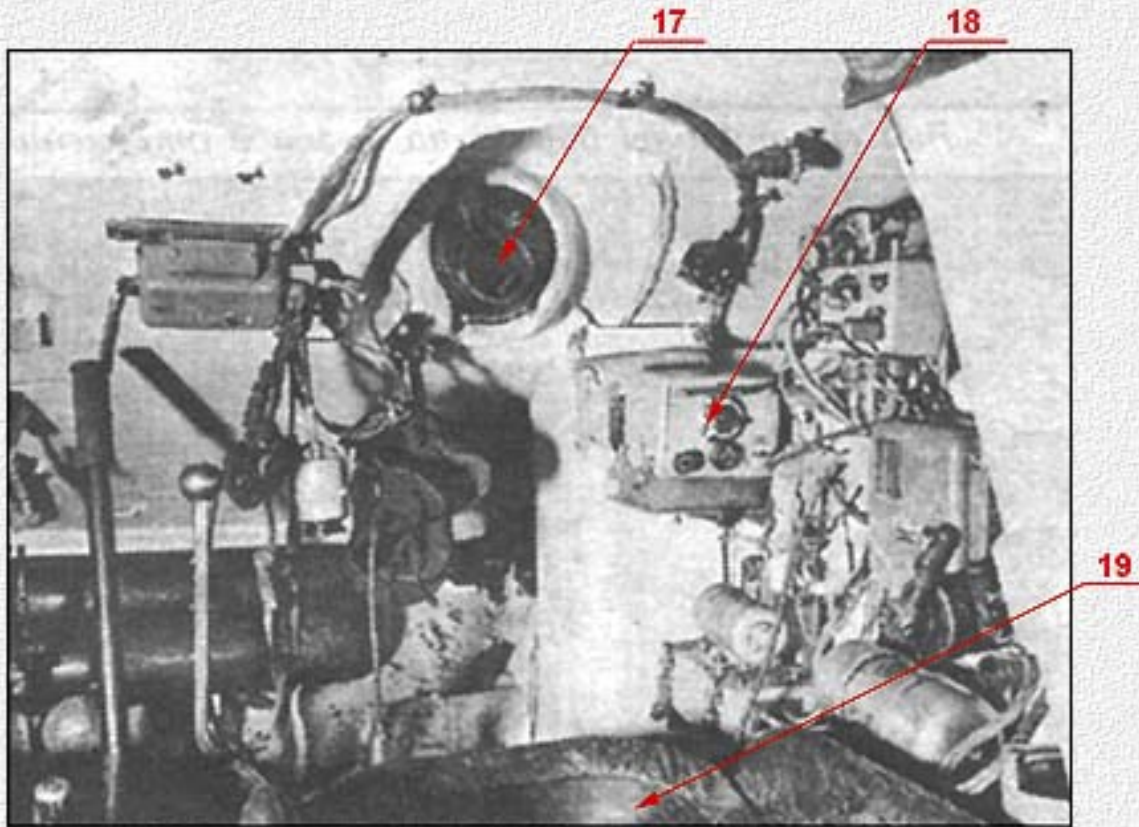
The fighting compartment was situated in the middle of the tank, with a commander's and a loader's station. On the hull top in front, on ball bearings, was the turret containing some ammunition, the main gun with coaxial 7.62 mm DT machine gun and observation sights. There were one or two hatches in the turret roof (depending on the type of turret).

The engine compartment was located behind the fighting compartment. These compartments were separated by a removable bulkhead with two round hatches in it. The engine compartment contained the engine, two water radiators, two oil radiators and four accumulators.



The driver's station.

- | | |
|---|---|
| 1. Speedometer and tachometer; | 9. The cylinders with compressed air; |
| 2. The pedal of the main friction clutch; | 10. The fuel injection pedal; |
| 3. The hand air pump; | 11. The foot-brake pedal; |
| 4. Control devices; | 12. The left steering lever; |
| 5. The TPU internal connection; | 13. The driver's seat; |
| 6. The right steering lever; | 14. The air distributor; |
| 7. The holder; | 15. The electric dashboard; |
| 8. The gear shift lever; | 16. The balancing mechanism of the hatch. |



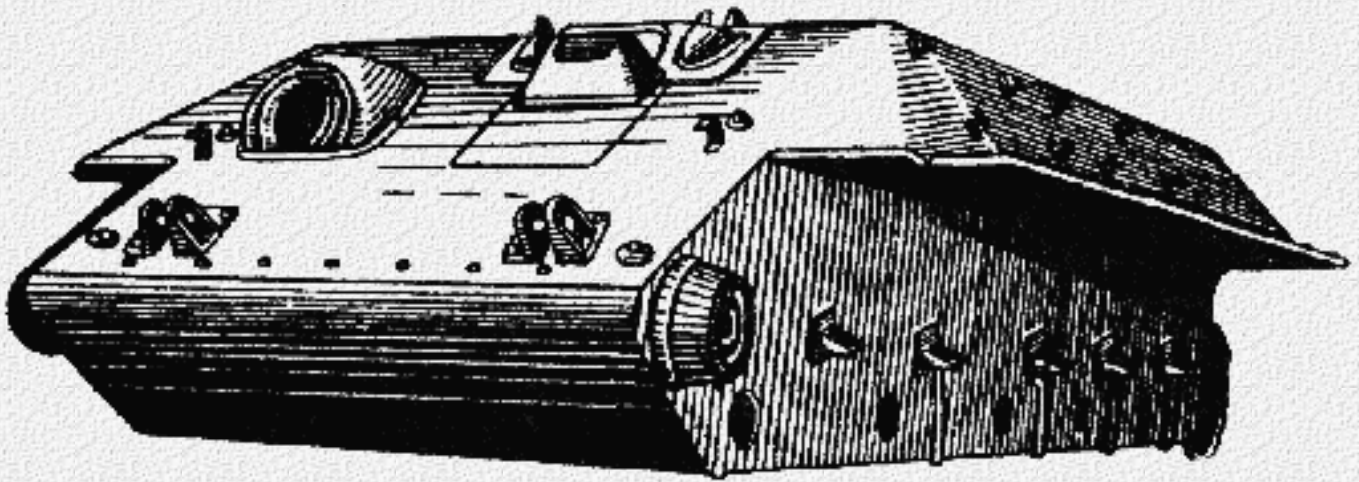
The radio operator's station

- 17. The bow MG;
- 18. The radio;
- 19. The radio operator's seat.

The transmission compartment was located in the rear. In it were the main friction clutch with centrifugal blower, the gearbox, side clutches with brakes, electric starter, transfer box, side gears and two fuel tanks.

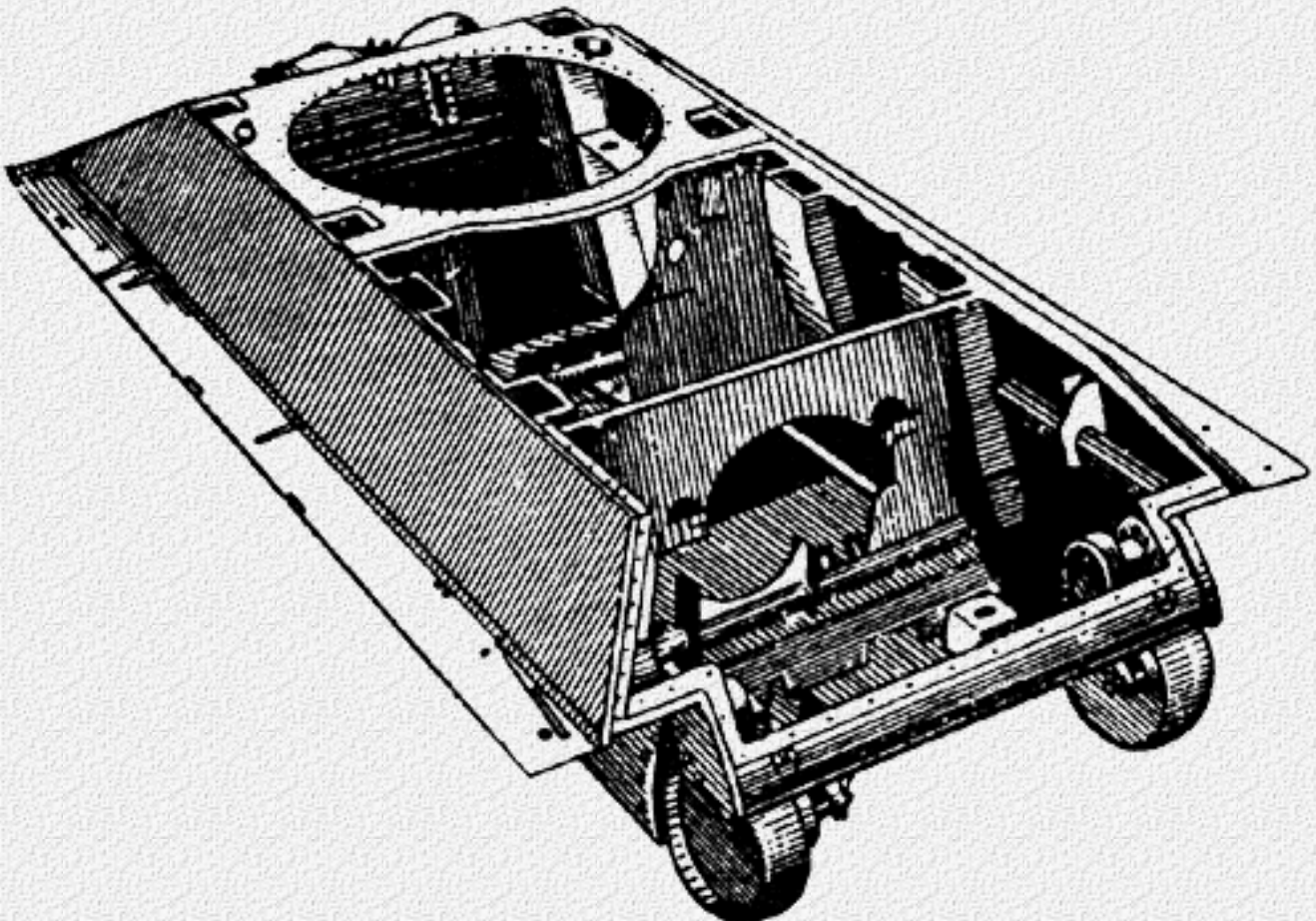
The hull

The hull was a rigid armored box with oblong rounded nose. It was made of rolled homogenous armored plate (steel grade MZ-3 or I8-S), welded together. The upper armor was sloped to increase it's protection. Main parts of the hull were: bottom, nose, sides, rear, roof and a bulkhead.



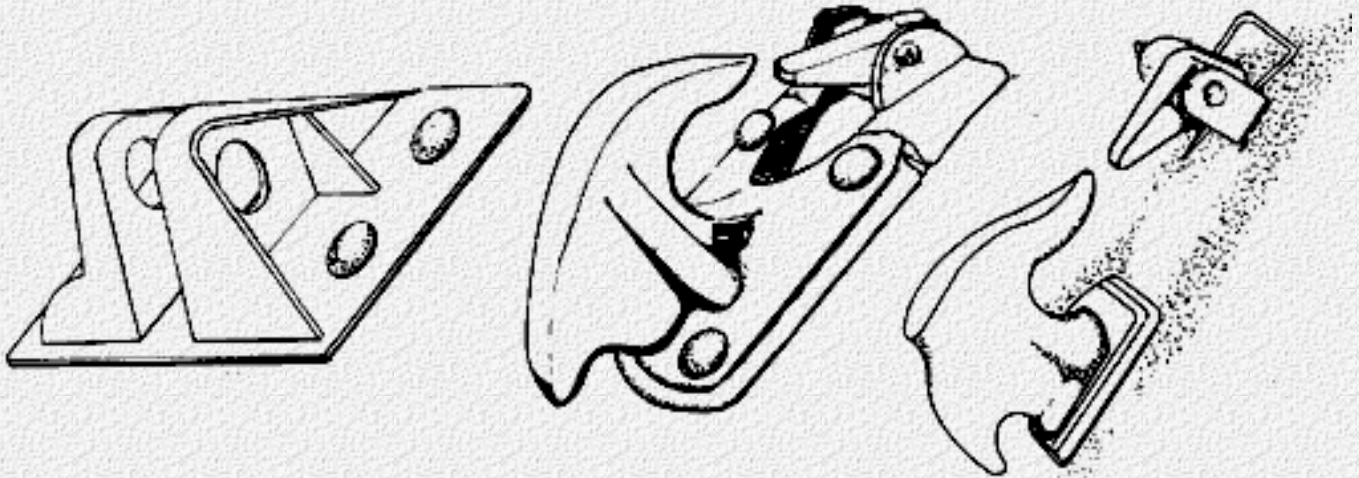
The hull of the T-34-76 Model 1940

The bottom consisted of two armored plates, which were welded butt. The joint was strengthened by a T-shaped steel girder, welded or riveted to the bottom (depending on the factory). Often the first bottom plate was slightly thicker than the second one (20-22 mm to 16-20 mm). The emergency hatch was in the first bottom plate, in the second were three hatches for maintenance, six apertures fitted with plugs and eight openings (four per side). The engine was screwed to the engine bay. This bay consisted of two transversal holders on which two parallel frames were fastened by 36 bolts.



The hull of the T-34-76 Model 1940

The nose of the hull consisted of a frontal girder, three armored plates, driver's hatch and armored mantlet for the bow machine-gun. The upper armor plate was welded butt to the frontal girder, side armored plates, and to the upper hull (roof). In 1942, the upper frontal plate and side plates were tongued and welded on the hulls which were manufactured by the Stalingrad shipyard (factory #264).

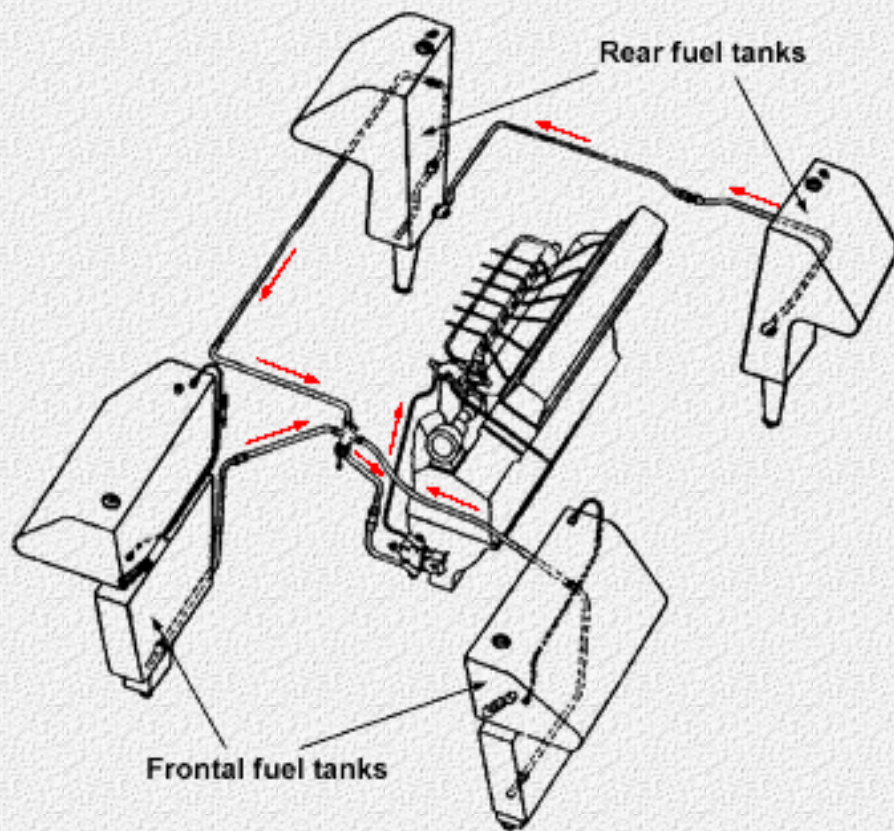


Towing hooks for: Model 1941, early Model 1942 and later Model 1942

On the left of the glacis was the driver's hatch for the driver and radio operator, In it three observation periscopes were mounted. Somewhere in the beginning of 1942, this hatch was simplified, now equipped only with two prismatic periscopes taken from the [A-43](#) project. These periscopes were protected by tip-up armored covers.

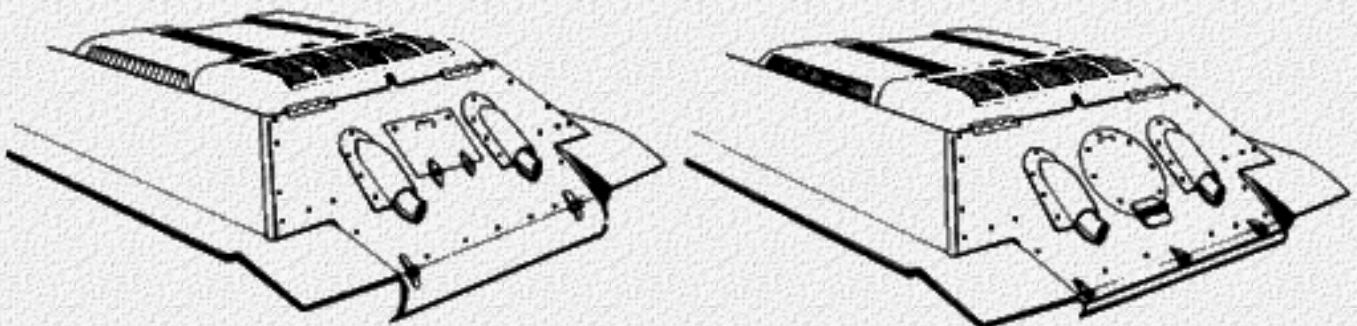
On the right side of the glacis the bow DT machine-gun was located. From 1942 on the DT received an armored mantlet except tanks being manufactured by STZ. The hull sides consisted of two parts: the lower and upper belts. The lower belt was placed vertically and had five holes for the swing arms for the road wheels. On the front of the lower belt was a housing for the track tensioning mechanism.

I must notice that track tensioning was a real pain for the crew, the tracks could be tensioned by three men equipped with one sledge-hammer and a couple of a hundred



The fuel system and location of the fuel tanks of the T-34.

for the side gears. The upper plate of trapezoid form was fastened to the lower plate and side belts, in it was a right-angled hatch. From 1942 on this was replaced with a round one (except tanks of the STZ factory). To the left and right of this hatch were two holes for the exhausts protected with armored covers.

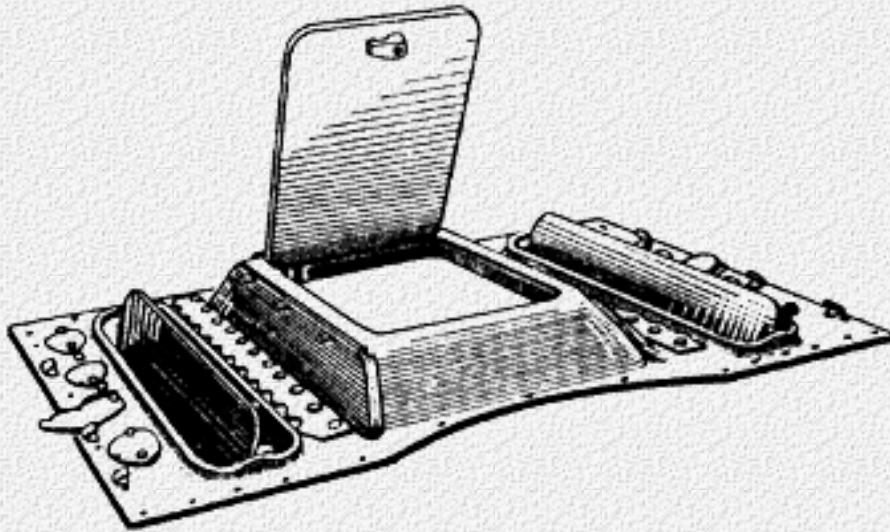


The rear of the T-34: for Models 1940-1941, and for the Model 1942.

The rear hull consisted of upper and lower armored plates and two cases of the side gears. The upper plate of trapezoid form fastened to the lower plate and side belts. There was the right-angled hatch. From 1942 it was replaced with rounded hatch (excluding the tanks of STZ factory). Besides the hatch, there were two holes for exhausts which were protected with armored casings.

coarse words. All attempts to simplify this process failed and the rest of the war Soviet tankers troubled with tracks tensioning. The upper belt was sloped on 40°. On the inside were ten housings with vertical coil-springs for the Christie suspension (five housings per side). Between these housings were four oil tanks located to the rear (as shown in the photo) and four fuel tanks located to the front.

These fuel tanks could cause the complete destruction of the tank, if they were half-empty and were hit with an AP round, [here you can see on how it looks](#). The rear hull consisted of upper and lower armored plates and two housings



**The rear engine's deck of the T-34-76 model
1940**

The rear armored deck behind the turret was slightly raised. It had four openings for quick access to the suspension elements. The engine's cover (rear deck) consisted of a longitudinal plate with a hatch to access the engine, a pair of plates placed over the radiators, a pair of longitudinal grills and domes over the radiators.

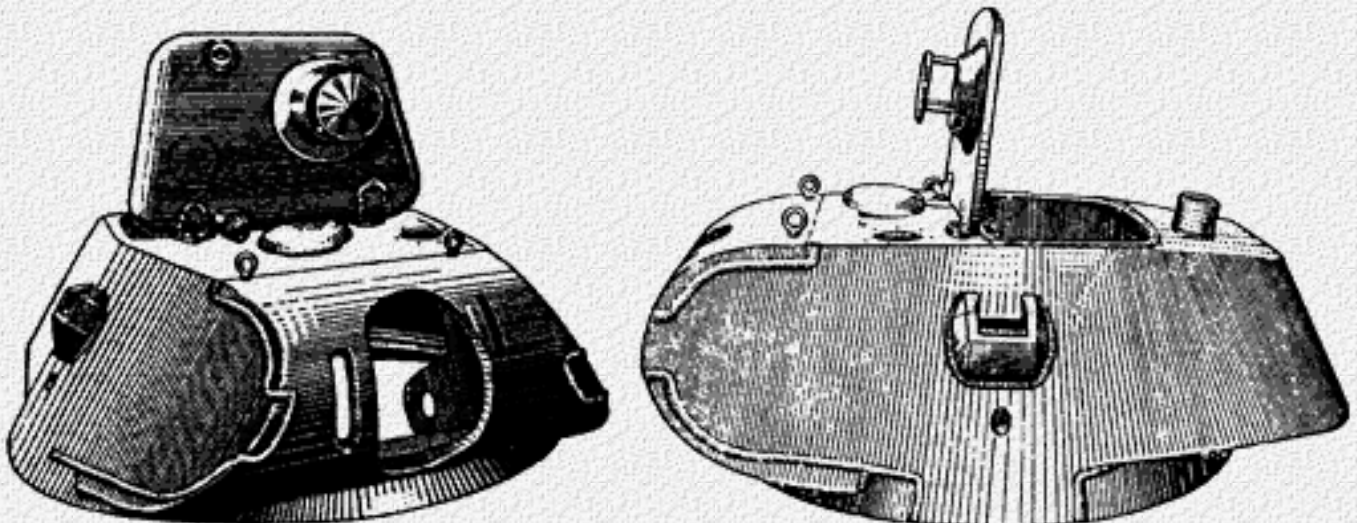
The armored deck over the transmission compartment consisted of two armored plates over the main fuel tanks, a narrow transversal plate and a wire mesh screen.

The turret

There were several types of turrets of the T-34:

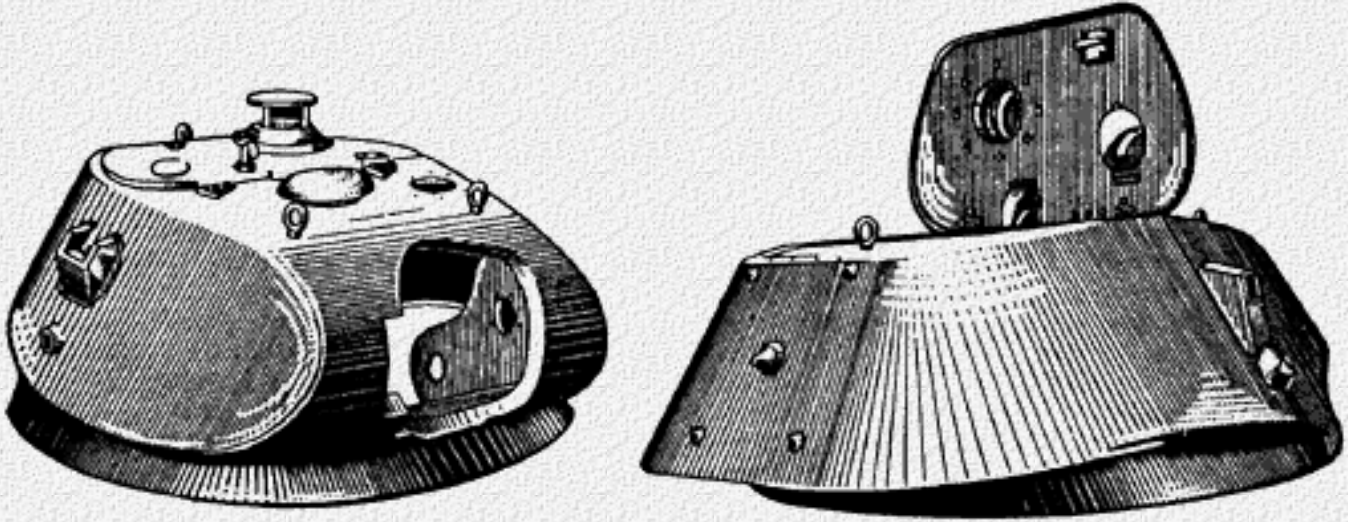
- a welded turret (1940-1942);
- a cast turret (1941-1942);
- a pressed hexagonal turret (1942-1944);
- a cast hexagonal turret (1942-1944).

In fact, the differences of all of these types were superficial, so let's examine the welded turret as an example.



The welded turret

It was mounted on ball bearings and was placed over the fighting compartment of the tank. In the turret front were three openings for the main gun, the coaxial DT machine-gun and for the telescopic sight. In the turret side plates were two openings for observation sights and two pistol ports.

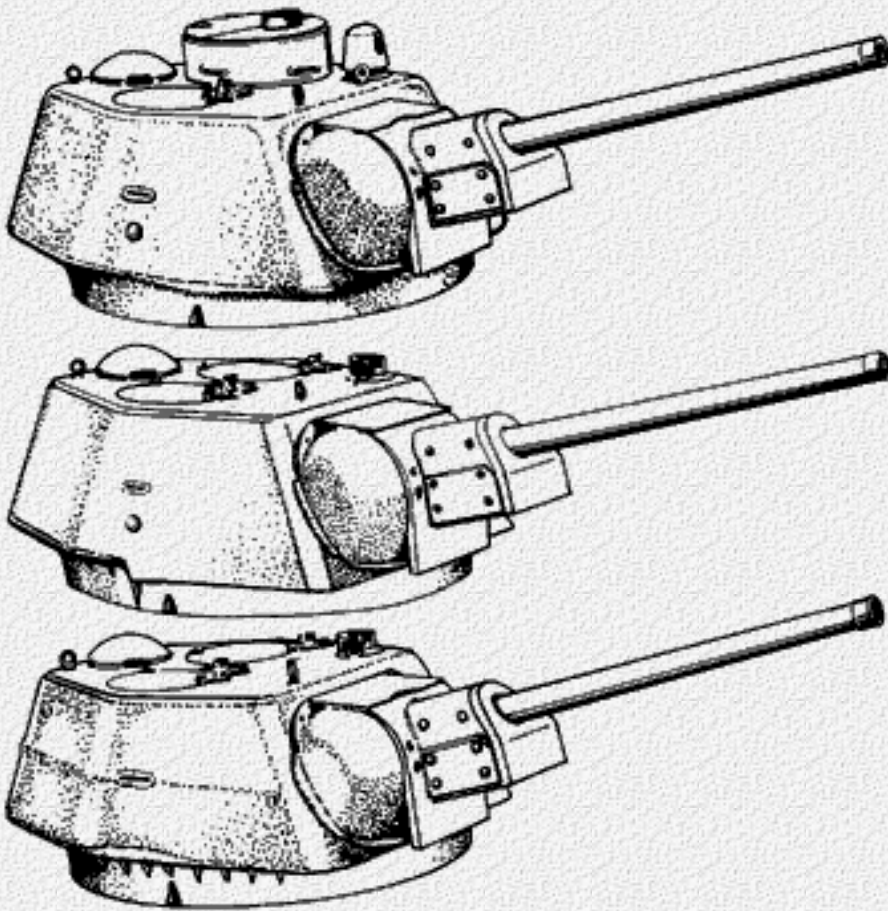


The cast turret

In the rear plate was a trapezoid hatch fastened with four or six screws. This hatch was used to replace the gun if it was damaged. Tanks being manufactured by the "Krasnoye Sormovo" Factory didn't have the hatch at all.

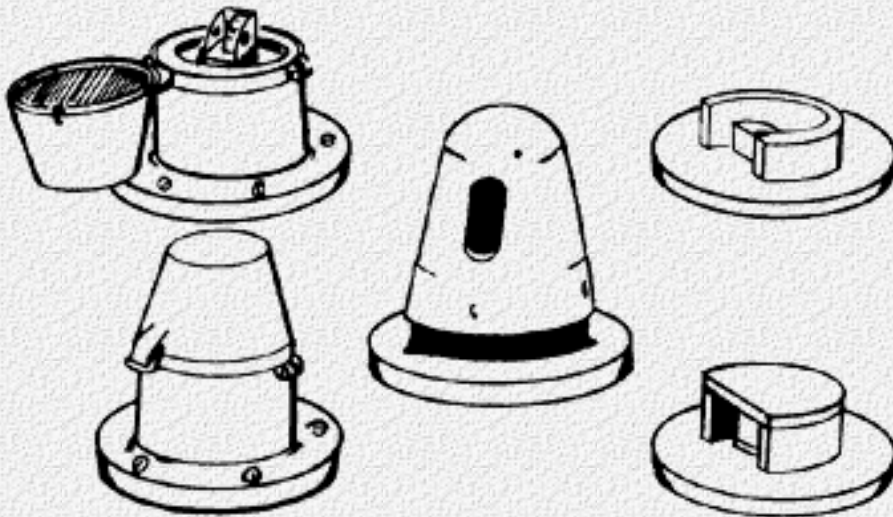
The turret top hatch was very clumsy, occupying the entire rear part of the roof, making it heavy to lift and also blocking the commanders view when open. Only one observation periscope was fitted to the hatch; at the left-hand front side. From the autumn of 1941 on this periscope was removed and it's opening was welded over. In 1942 this opening was discarded at all.

In the front upper deck were two openings; left for the periscope sight and the right one for the ventilator (covered with an armored cover). From the end of 1941 on



Various types of the cast hexagonal turret

two pistol ports, these ports could be locked by conic plugs.



Various observation periscopes: the PT-4-7 (opened and closed); the PTK-5; the MK-4 (opened and closed)

there were two openings for the sights; on the left and right of the ventilator.

Tanks of the first production batches had an antenna hole in the rear turret. Further deliveries didn't have it or it was welded over, because of the radio, which was relocated from the turret to the hull.

In 1942 a new hexagonal turret was developed. It was either cast or pressed (depending on the factory). It's frontal plate had a rectangular opening for the armament installation. On the outside this was covered with an armored gun shield, which was fastened with screws.

The turret sides had observation sights. From 1943 on there were

The turret roof was made of a single flat plate. On the front left side was an opening for the periscope sight, command tanks also had a panoramic sight on the right front. In the middle of the turret top plate were two round hatches for commander and loader. Between these hatches was a bulkhead, which was made removable to make it easier to take out the side fuel tanks through the turret, otherwise the turret should be removed first.

In the rear turret roof was a ventilator which was protected by an armored lid. From 1943 on some tanks were equipped with a cylindrical commander's cupola. Such tanks didn't have a removable bulkhead between the hatches, so the internal fuel tanks could only

be taken out after the turret being taken away.

Turrets of all types could be traversed with the aid of an electric traversing motor or by hand wheel operated by the commander. With the aid of an electric motor the turret could be traversed on 360 degrees in 14 seconds.

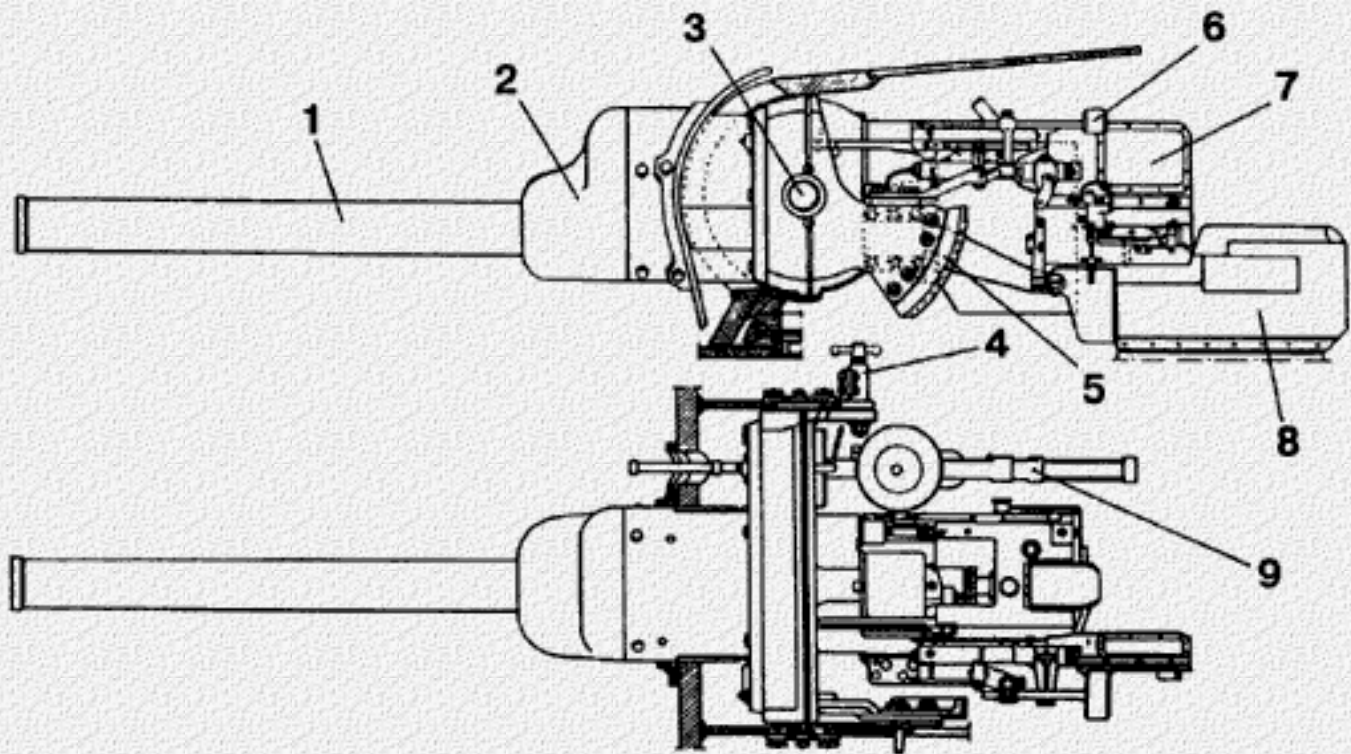
Armament

First production T-34's (also known as Model 1940) were armed with the 76.2 mm Tank Gun L-11 Model 1938/39 (see the Table 1). The gun had a semi-automatic (self-locking) vertical breech-block, although the self-locking mechanism could be turned off.

Table 1. Specifications of the L-11 and the F-34 tank guns

Parameter	L-11	F-34
Caliber, mm	76.2	76.2
Barrel length, clb	30.5	41.5
Weight, kg	?	1,155
Recoil length, m	?	0.39
Elevation	- 5° +25°	- 5°30' +25.6°48'
Practical rate of fire, shots/min	1-2	2-4

From February-March 1941 on the more modern and powerful gun was accepted to be used for the T-34's main armament: the 76.2 mm Tank Gun F-34 Model 1940 (see the Table 2). This gun had a self-loading breech-block. Its recoil mechanisms consisted of a hydraulic recoil buffer and a recoil spring which were located under the barrel. The gun could be fired in two different ways, either by hand or by foot pedal.

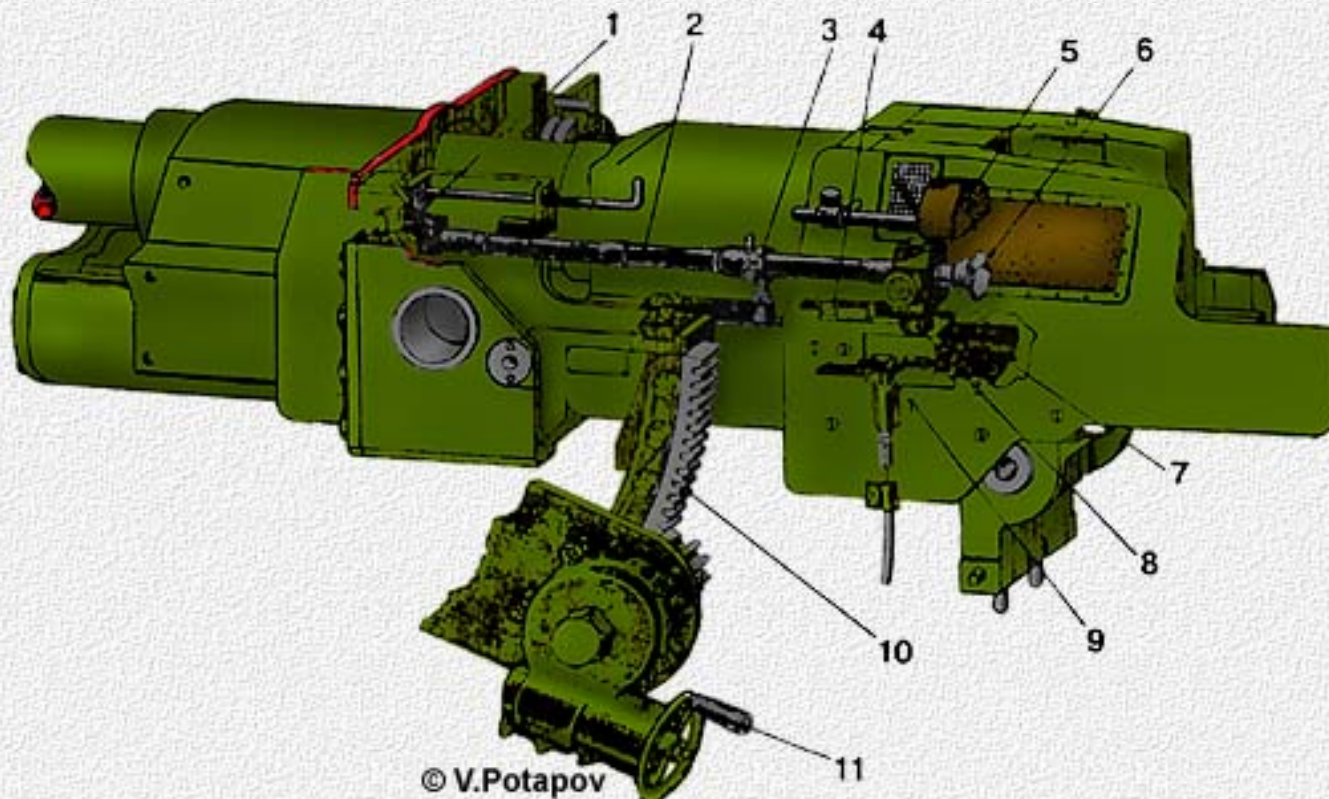


The L-11 tank gun

- | | |
|-----------------------|-------------------------------|
| 1. The barrel; | 6. The headrest of the sight; |
| 2. The gun mantlet; | 7. The pillow; |
| 3. The trunnion; | 8. The shell-bag; |
| 4. The stow lock; | 9. The coaxial MG. |
| 5. The gear quadrant; | |

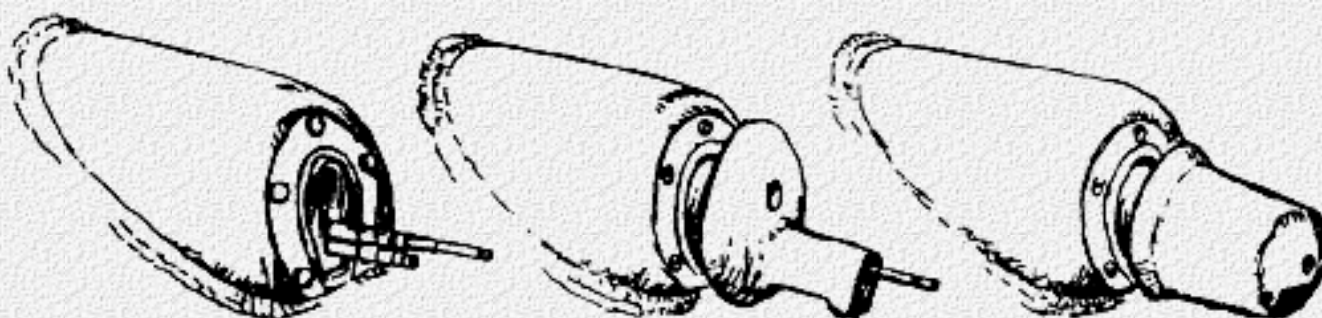
The F-34 gun has been modernised twice. During the first modernisation the breech-block and self-loading mechanism were altered; the canceller and buffer were removed. During the second modernisation the new monoblock gun was connected with the breech-end by a special muff.

Besides it's gun, the T-34 was armed with two 7.62 mm DT machine-guns where the "DT" abbreviation means "Degtyarev's tankoviy" (a tank variant of Degtyarev's machine-gun). One of these machine-guns was made coaxial with the main gun, the other MG was mounted in a spherical installation in the glacis.



The F-34 tank gun

- | | |
|-------------------------------|-------------------------------|
| 1. The thimble; | 7. The horizontal adjustment; |
| 2. The telescopic sight; | 8. The angular adjustment; |
| 3. The sight's holder; | 9. The trigger; |
| 4. The recoil ruler; | 10. The elevation mechanism; |
| 5. The headrest of the sight; | 11. The hand wheel |
| 6. The eye shade; | |



The DT machine-gun mount without the armor mantlet; the DT with armor mantlet; the ATO-42 flamethrower mount.

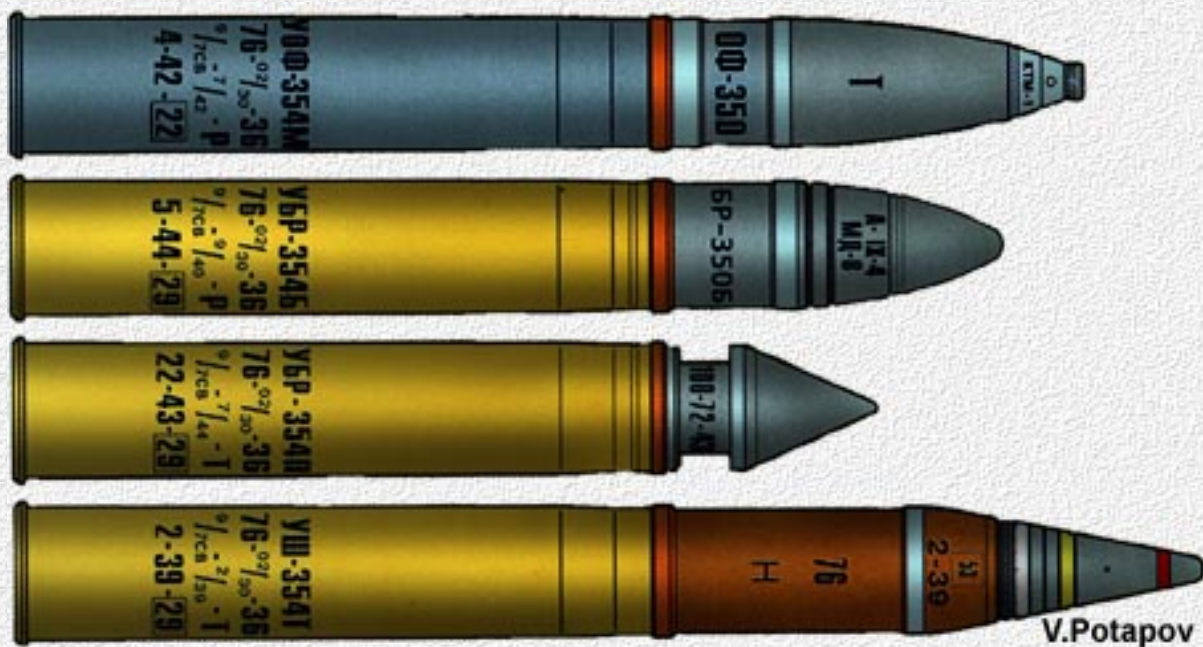
The L-11 gun equipped with the TOD-6 telescopic sight and PT-6 periscope panoramic sight. The F-34 gun equipped with TOD-7 telescopic sight and PT-7 panoramic sight, later they were replaced with a TMFD-7 telescopic and a PT-4-7 panoramic sight. Command tanks equipped with an additional PT-K panoramic observation sight.

Both the L-11 and the F-34 used the same ammunition, mostly from the 76 mm Divisional Gun Model 1902/30 and from the 76 mm Regimental Gun Model 1927 (see Table 3).

Table 2. Projectiles for the L-11 and the F-34 tank guns

Round index	Projectile index	Type	Fuse	Projectile weight, kg	Description
UOF-354M	OF-350	fragmentation	KTM-1	6.2	steel case; long range
UOF-354A	OF-350A	fragmentation	KTM-1	6.23	steely iron case; long range
UF-354	F-354	high-explosive	KT-3, KTM-3, 3GT	6.41	old Russian type
UBR-354A or UBR-353A	BR-350A	armor-piercing	MD-5	6.3	with tracer
UBR-354B or UBR-353B	BR-350B	armor-piercing	MD-5, MD-8	6.3	with tracer
UBR-354SP or UBR-353SP	BR-350SP	armor-piercing	n/a	6.3	solid; with tracer
UBR-354P	BR-350P	sub-caliber	n/a	3.02	introduced in October 1943
USh-354	Sh-354	shrapnel	22-second	6.5	bullet shrapnel
USh-354T	Sh-354T	shrapnel	T-6	6.5	bullet shrapnel
USh-354G	Sh-354G	shrapnel	22-second	6.58	Gartz's shrapnel
USh-R2-354	Sh-361	shrapnel	T-3UG	6.61	bar shrapnel
UShe-354	She-350	case-shot	?	?	-

Here I would like to point out on a fact, that despite some publications the T-34 did **never** use any hollow-charge (HEAT) ammunition. Usually publications refer to the UBP-354A, although it was a round for regimental guns, it was **prohibited** to use for the L-11 and for the F-34 guns because it exploded inside the barrel.

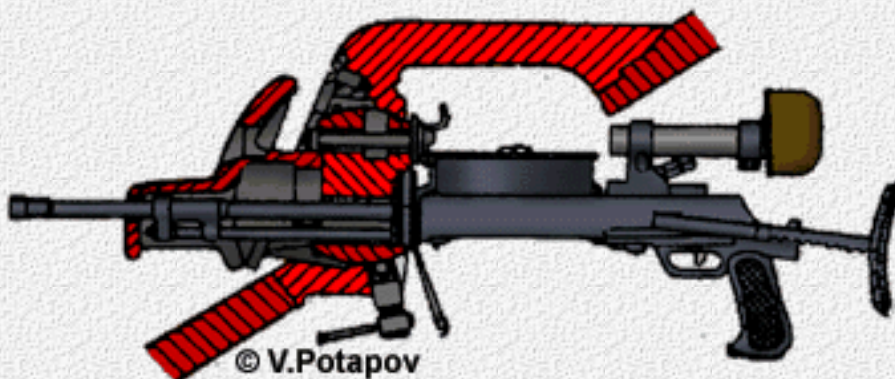


Ammunition for the T-34-76:

- the high-explosive fragmentation round UOF-354M;
- the armor-piercing round UBR-354B;
- the armor-piercing subcaliber round UBR-354P;
- the bullet shrapnel round USh-354T.

Tanks model 1940 and model 1941 had 77 rounds which were located on the floor (68 rounds) and the sides (9 rounds) of the fighting compartment.

Tanks model 1942 with hexagonal turret had 100 rounds: 75 high-explosive and fragmentation rounds, 21 armor-piercing rounds and 4 sub-caliber rounds. These ammunition was located on the floor (8 boxes with 86 rounds in total) of the fighting compartment.



The DT machine-gun mount.

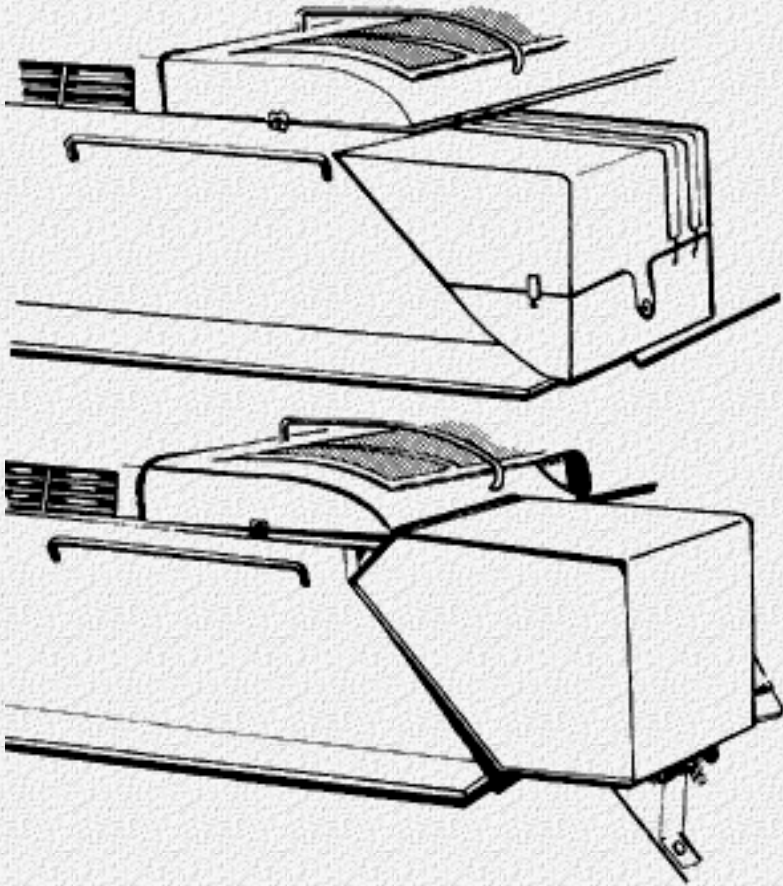
The other ammunition was distributed as following: 2 AP rounds with tracers were stored in the installation on the right rear corner of the compartment; 8 fragmentation rounds were stored on the left side of the compartment; 4 sub-caliber rounds were stored in the installation on the right side of the compartment.

[Here you can see the typical result of exploding of the ammunition stored in the bottom of the T-34.](#)

Initially, tanks of the first deliveries with radio had 46 magazines for it's machine-guns.

The magazine had 63 rounds capacity, thus, 2898 rounds total. Tanks without radio had 75 magazines (4725 rounds). Tanks with hexagonal turret had 50 magazines (3150 rounds), one PPSH sub-machine gun supplied with four magazines, and 25 grenades F-1 ("pineapples").

The engine and transmission



The squared fuel tanks: small (above) and big (below).

The T-34 tank had the V-2-34 12-cylinder diesel engine (see Table 4). It consumed either diesel oil type "DT" or gas-oil type "E" (OST 8842). In any case, fuel was fed by the NK-1 12-plunger injection pump. The tanks of the first deliveries had 6 internal fuel tanks with a total capacity of 460 liters plus 4 external fuel tank with a total capacity of 134 liters. By the end of the summer of 1943 the total number of all fuel tanks was increased up to 8 and their summary capacity was 540 liters. Four external fuel tanks were replaced with two rear placed squared fuel tanks, from 1943 on they were replaced with two cylindrical fuel tanks of 90 liters each. Soon, their number was increase by a additional 90-liter fuel tank. They were placed on both sides of the tank: one tank on the left side and two tanks on the right side. Usually one of them was filled up with oil (the V-2 consumed a tremendous amount of oil!). The external fuel tanks didn't plug in the engine's feed system.

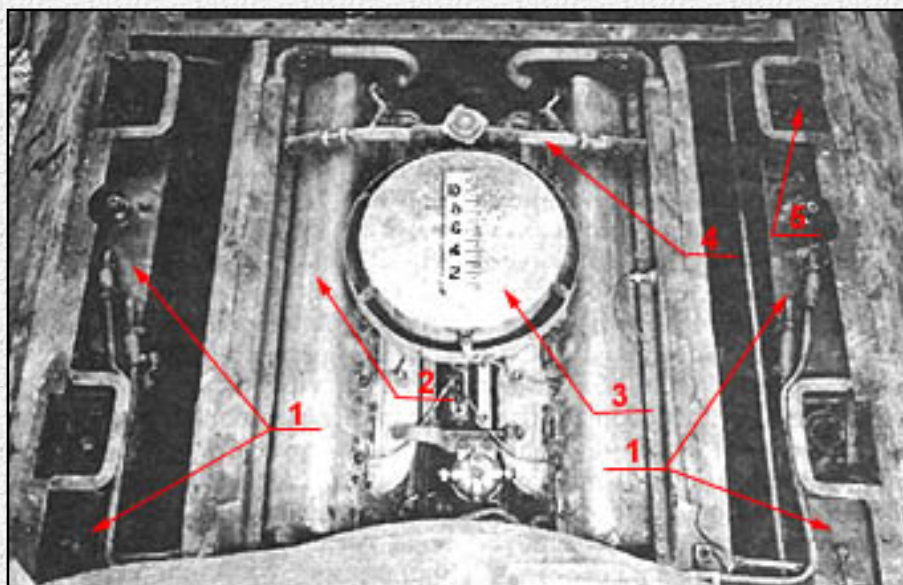
Table 3. Specification of the V-2-34 engine

Parameter	V-2-34
Type	four-cycle
Number of cylinders	12
Dry weight, kg	750

Nominal power (1750 revs), h.p.	450
Service power (1700 revs), h.p.	400
Max power (1800 revs), h.p.	500
Cylinder bore, mm	150
Left piston stroke, mm	180
Right piston stroke, mm	186.7
Angle between cylinders	60°
Compression ratio	14-15

The lubrication system was circulated by the lubricating pump unit.

The cooling system was water-cooled by the water pump unit. Two radiators which were placed on both sides of engine, their total capacity was 95 liters.

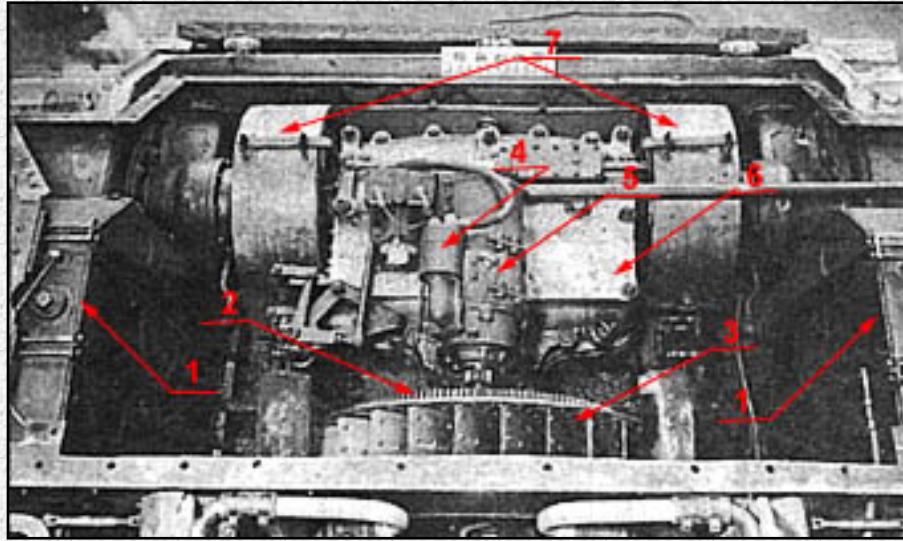


The engine's compartment

1. The oil tanks;
2. The engine;
3. The air filter;
4. Pipes of the cooling system;
5. The boxes with elements of suspension.

T-34's of the first deliveries had one "Pomon" air-filter, later it was replaced with two improved "Cyclone" air-filters.

The engine could be started either by electric starter (15 h.p.) or by compressed air (there were two oxygen bottles in the steering compartment).



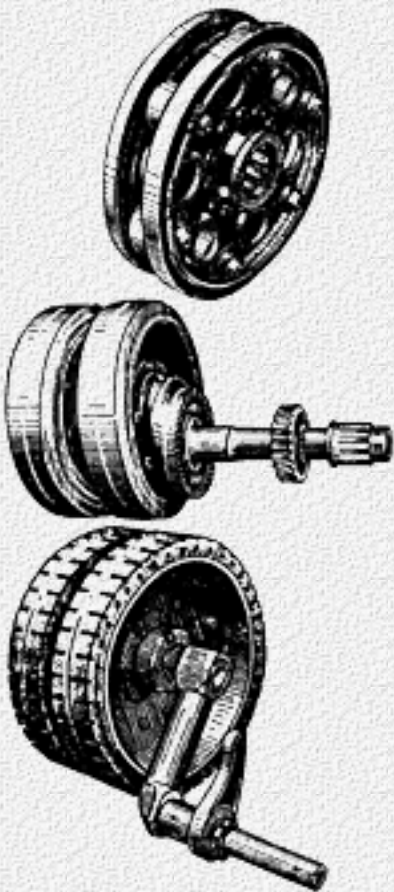
The transmission compartment

1. The rear fuel tanks;
2. The main friction clutch;
3. The ventilator;
4. The electric relay;
5. The electric starter;
6. The gearbox;
7. The side friction clutches.

The transmission consisted of the main friction clutch of dry friction (steel over steel), the gearbox, the brakes, the side clutches and the side gears. The first gearbox was four-speed, from the end of 1942 on it was replaced with an advanced five-speed gearbox.

The chassis

The tank chassis consisted of five doubled road wheels (diameter 830 mm), the idler and the drive sprocket. Road wheels of different factories distinguished significantly. There were:

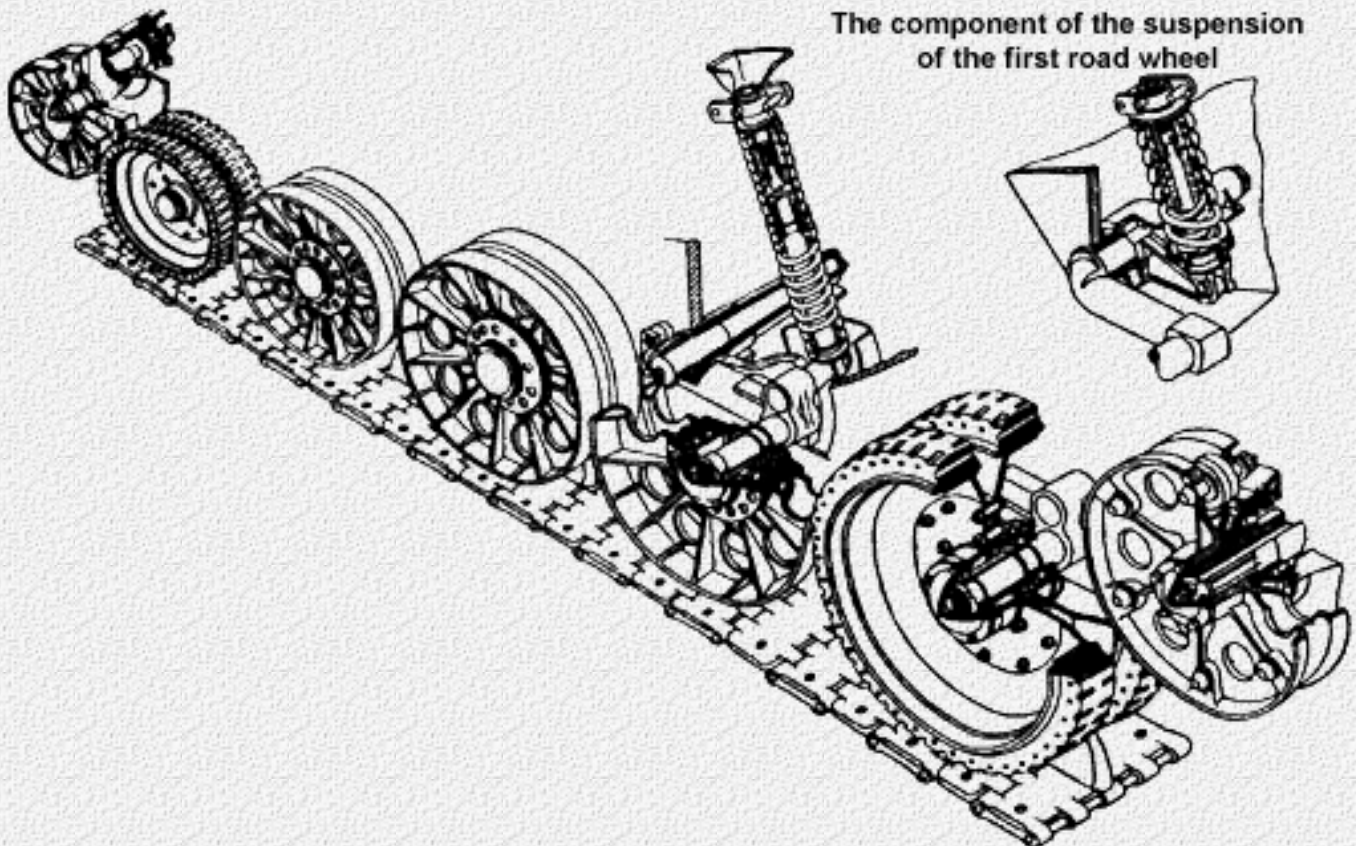


1. cast with rubber tyre;
2. pressed with rubber tyre;
3. cast without rubber but with internal shock-absorption;
4. pressed without rubber but with internal shock-absorption;
5. pressed without rubber and internal shock-absorption (manufactured on the STZ only).

Each road wheel had an independent suspension mounted on a vertical coil-spring. The idler was casted, on early tanks it had a rubber tyre.

Tracks were either cast or pressed. On early tanks tracks consisted of 74 links (37+37) 550 mm wide. From 1942 on tanks received new tracks consisting of 72 links (36+36) 500 mm wide.

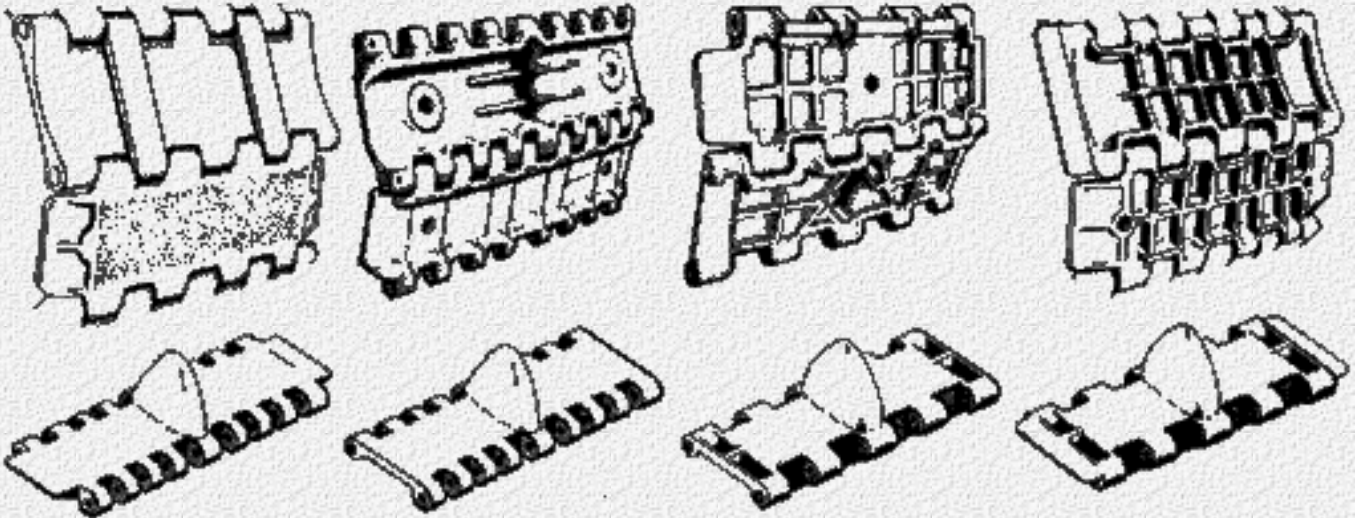
**The driving wheel,
the idler with
rubber tyre, and
the road wheel**



**The component of the suspension
of the first road wheel**

Electrical equipment

The electric circuit of the T-34 was single-wire. Voltage 24V and 12V. Current sources: the GT-4563A generator (1 kilowatt), four 6-STE-128 accumulators of capacity 128 Ah each. Consumers: the ST-700 electric starter, electric traversing motor of the turret, ventilator, control and monitoring devices, electric horn, dynamotor of the radio.



Various tracks: the 550-mm smooth track; the 500-mm smooth track; the 500-mm grooved track; the 550-mm grooved track.

Communication facilities

The T-34 tanks of the first deliveries were equipped with the 71-TK-3 short-wave simplex radio. In 1941 it was replaced with the 9-R short-wave simplex radio. From 1943 on all T-34's (both T-34-67 and T-34-85) were equipped with the modernised 9-RM 71-TK-3 short-wave simplex radio with extended range.

The internal communication in tanks of the first deliveries was by means of the TPU-2 or TPU-3 of pre-war design. Later, all T-34's were equipped with the improved TPU-3-bisF. Anyway, only the commander and the driver had internal communication. The radio operator and the loader didn't.

REFERENCES:

[T-34-76 development history](#)

[The T-34-76 in action](#)

[Interior of the T-34-76 Model 1941](#)

[T-34 profiles](#)

[Specification of Soviet tanks](#)

[Specifications of Soviet tank guns](#)

Sources:

"The T-34 medium tank. Album of construction elements", NKTP, 1941;

"The T-34 tank. Maintenance", NKTP, 1941;

"The T-34 tank. Operational manual", Voenizdat, 1941;

Bronekolleksiya #3, 1999;

I.Shmelev "The T-34", Technics and Armament #11-12, 1998;

J.Magnuski "Wozy bojowe", LWP, Warsaw, 1985;

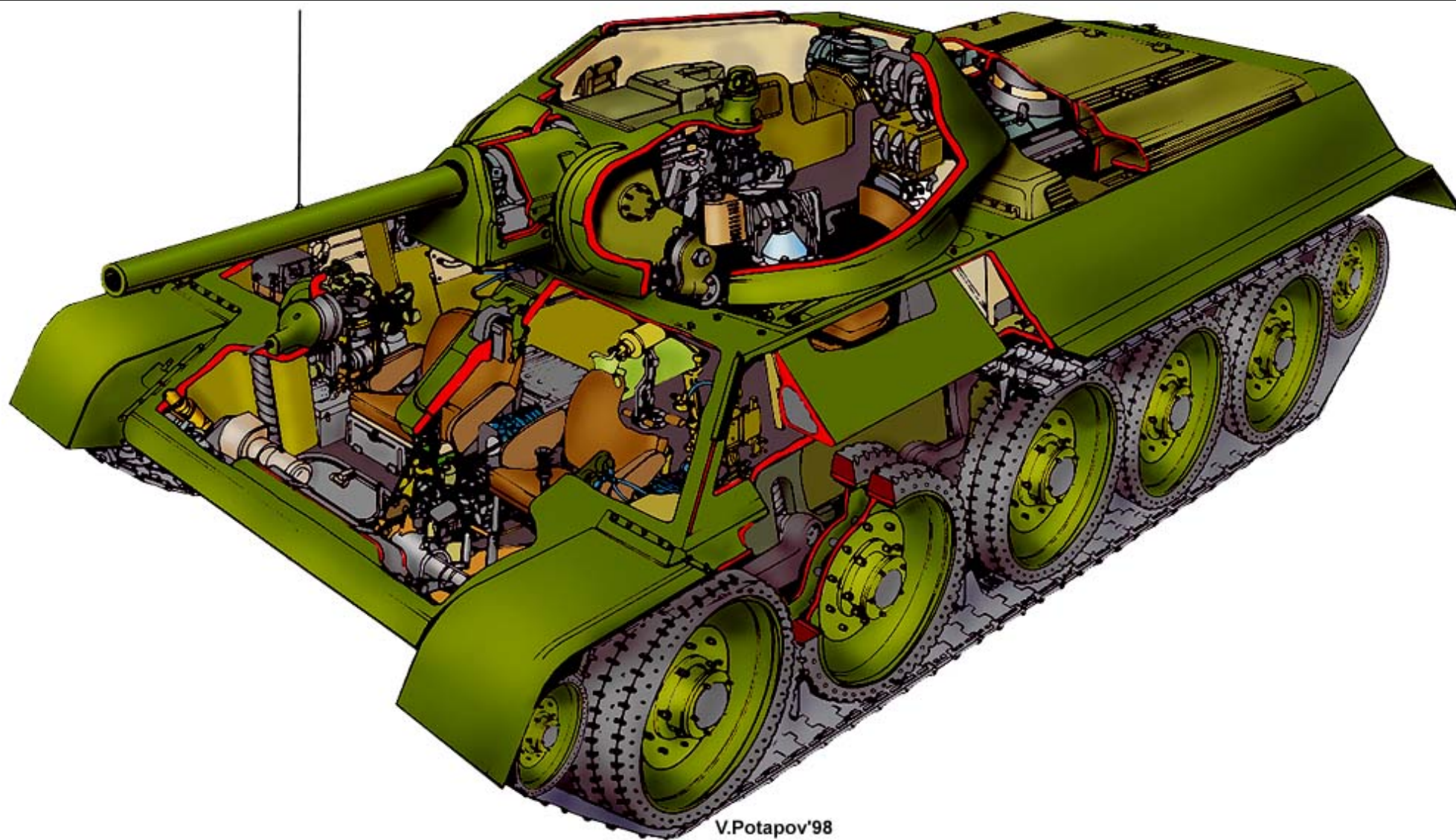
S.Zaloga, J.Grandsen "T-34 in action";

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The Interior of the T-34-76 Medium Tank Model 1941

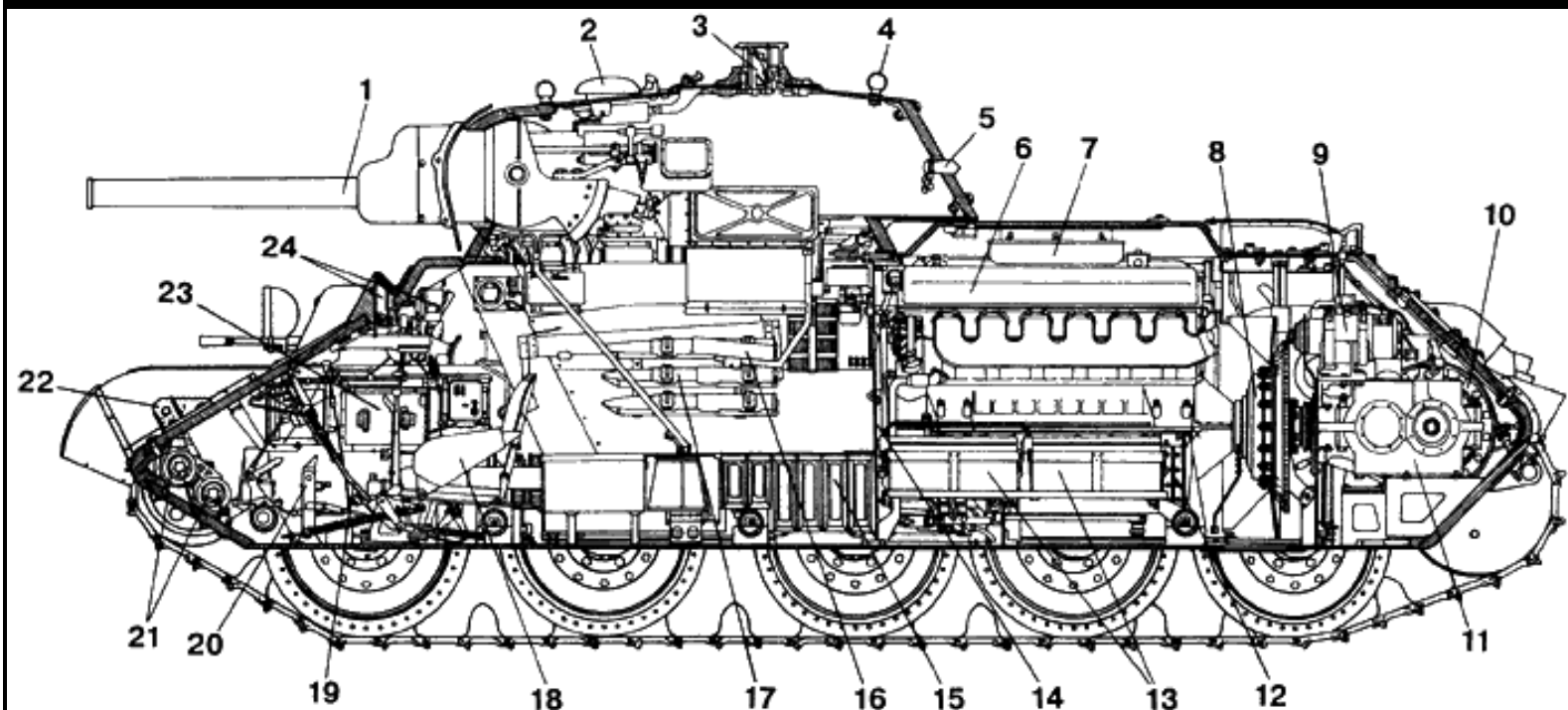


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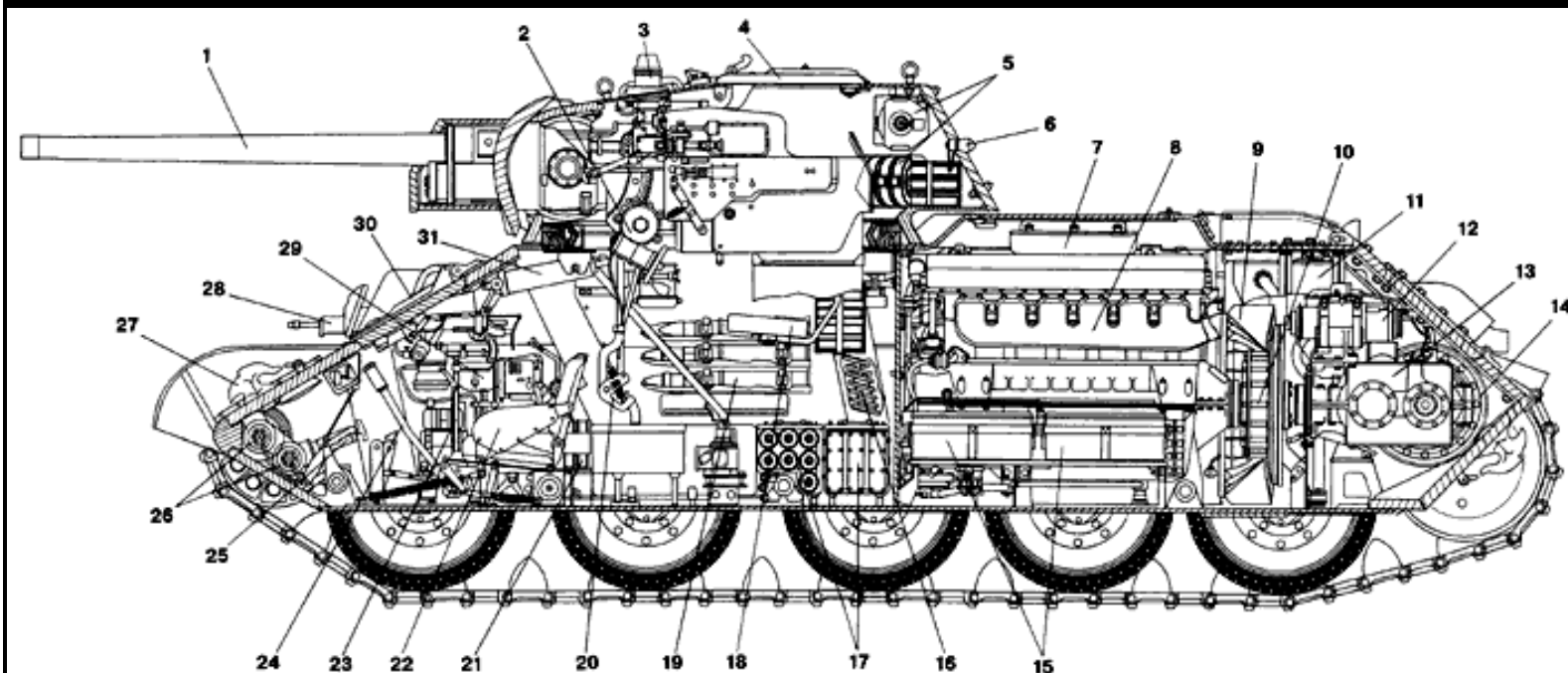


Profile of the T-34-76 Model 1940



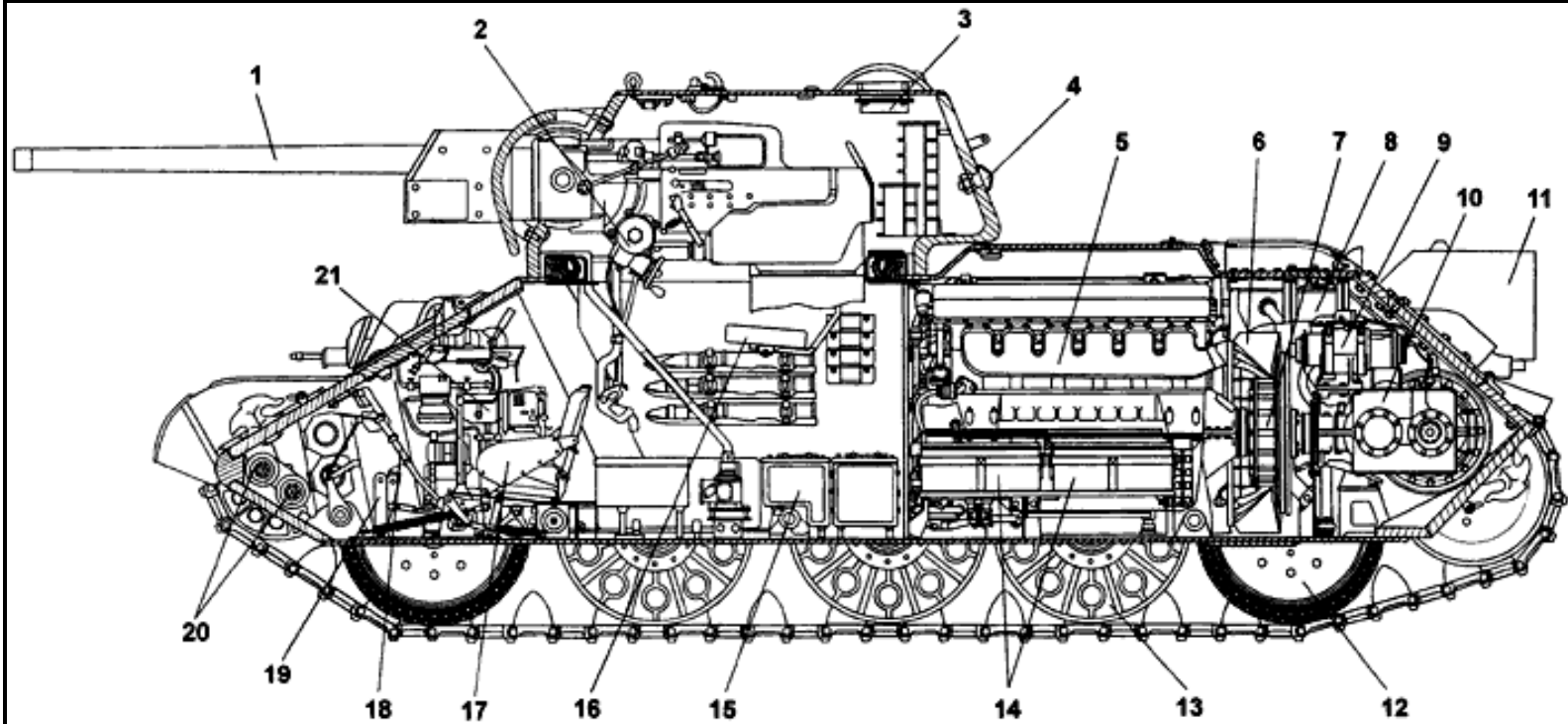
1 - the L-11 gun; 2 - the ventilation hatch; 3 - all-around looking prism; 4 - the rim; 5 - the loophole's gag; 6 - the engine; 7 - the air filter; 8 - the main friction clutch; 9 - the starter; 10 - the side clutch; 11 - the gearbox; 12 - the engine's frame; 13 - accumulators; 14 - the bulkhead; 15 - vertical ammunition storage; 16 - the commander's seat; 17 - ammunition on the right side; 18 - the driver's seat; 19 - steering levers; 20 - main friction clutch pedal; 21 - cylinders with compressed air; 22 - towing hooks; 23 - the radio; 24 - driver's observation sights.

Profile of the T-34-76 model 1941



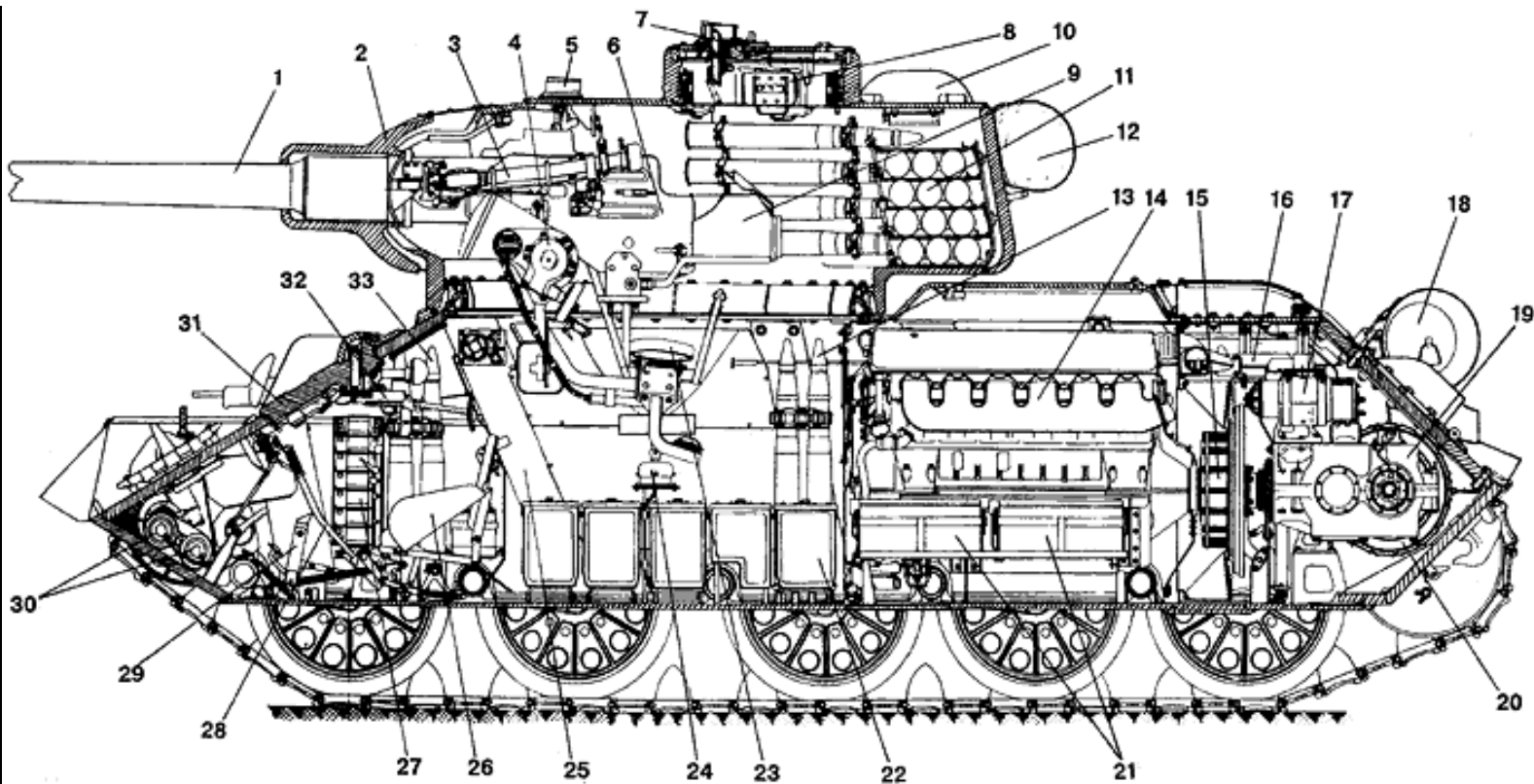
1 - the F-34 gun; 2 - the elevation mechanism; 3 - the PT-4-7 periscopic sight; 4 - the hatch; 5 - machine-gun's magazines; 6 - the loophole's gag; 7 - the air filter; 8 - the engine; 9 - the ventilator; 10 - the main friction clutch; 11 - the rear fuel tank; 12 - the starter; 13 - the gearbox; 14 - the side clutch; 15 - accumulators; 16 - suspension spring; 17 - the ammunition storage; 18 - the commander's seat; 19 - ammunition on the right side; 20 - the gun trigger pedal; 21 - magazine's of the bow machine-gun; 22 - the driver's seat: 23 - the gearbox shift lever; 24 - the steering levers; 25 - the fuel injection air-pump; 26 - cylinders with compressed air; 27 - towing hooks; 28 - the machine-gun mantlet; 29 - the radio; 30 - the driver's hatch; 31 - the balancer of the hatch.

Profile of the T-34-76 model 1942



1 - the F-34 gun; 2 - the elevation mechanism; 3 - the ventilator; 4 - the gag; 5 - the engine: 6 - the ventilator; 7 - the main friction clutch; 8 - the air filter; 9 - the starter; 10 - the gearbox; 11 - the external fuel tank; 12 - the rubberised road wheel; 13 - the road wheel with internal shock-absorption; 14 - accumulators; 15 - the ammunition storage on the floor; 16 - the commander's seat; 17 - the driver's seat; 18 - steering levers; 19 - main friction clutch pedal; 20 - cylinders with compressed air; 21 - the radio.

Profile of the T-34-85 model 1944



1 - the ZIS-S-53 gun; 2 - the gun's mantlet; 3 - the TSh-16 telescopic sight; 4 - the elevation mechanism; 5 - the loader's MK-4 observation sight; 6 - the gun's jacket; 7 - the commander's MK-4 observation sight; 8 - the glass block; 9 - the shell-bag; 10 - the ventilator's armored cupola; 11 - the ammunition storage; 12 - the canvas bag; 13 - the ammunition storage for two rounds; 14 - the engine; 15 - the main friction clutch; 16 - the "Multicyclon" air filter; 17 - the starter; 18 - the BDSH smoke block; 19 - the gearbox; 20 - the side gear; 21 - accumulators; 22 - the ammunition storage on the floor; 23 - the gunner's seat; 24 - the gun trigger pedal; 25 - the suspension's shaft; 26 - the driver's seat; 27 - machine-gun's magazines; 28 - steering levers; 29 - the pedal of the main friction clutch; 30 - cylinders with compressed air; 31 - the driver's hatch; 32 - the DT BMG; 33 - the ammunition storage.

Sources:
"Bronekolleksiya #3-4, 1999

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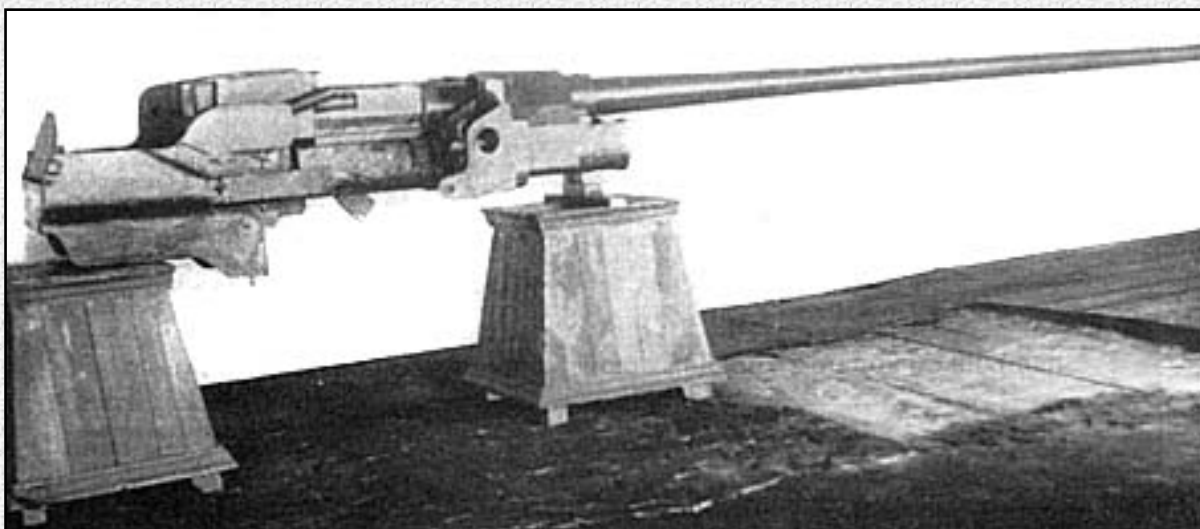
The T-34-57 Tank Destroyer

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Development History

On June 13, 1940, president of the Security Council S.Timoshenko referred to Central Committee of the Communist Party and SNK USSR the report "...about insufficient power of the armament of existing KV and T-34 tanks, and about other prospective tank projects". On June 27, the special session of the SNK was devoted to that question. Session acknowledged the insufficient power of the 45 mm tank guns and considered them as having no perspective. To replace them, new 55-60 mm guns should be developed.



The 57 mm Tank Gun ZIS-4. *(M.Svirin)*

At that time, Grabin's design bureau was working already on 57 mm antitank gun (ZIS-2), that's why it was ordered to develop a tank variant of that 57 mm gun, but first drafts of such gun was already developed by Grabin's initiative.



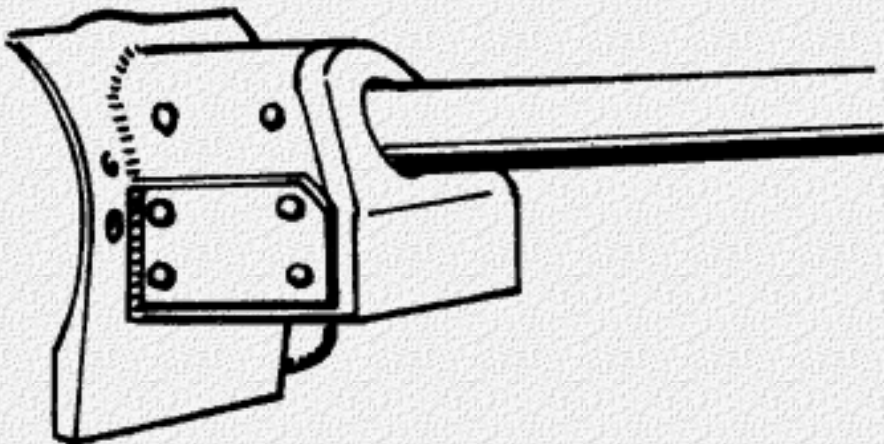
The T-34-57 on trials on the Sofrino proving ground. (M.Kolomietz)

The manufacture of the first prototype of 57 mm tank gun had launched in September 1940, but until December manufacturing preparations were slow because improvement and mass production of the 76.2 mm F-34 tank gun overloaded factory. Nevertheless, in the beginning of December 1940, the very first prototype of 57 mm tank gun was manufactured.

Till the end of March 1941, being

mounted on gun-carriage, it was on factory trials. In April 1941, gun was mounted on production T-34 and sent to ANIOP for trials on the proving ground. Those trials have revealed an extremely short life of its barrel (overheated after 100-150 shots) and low accuracy.

In July 1941, an improved gun, being named ZIS-4, was installed in T-34 and tested again on Sofrino proving ground. Trials were successful and gun was recommended for service in spite of its cost price. ZIS-4 was too expensive mostly because of very long barrel. Nevertheless its price, gun was accepted for service because of high demand of powerful antitank guns. ZIS-4 was intended to rearm some production T-34 to convert them into "tank-hunters" (T-34-75). Following the order of NKV, ZIS-4 was set up for mass production on factory #92.

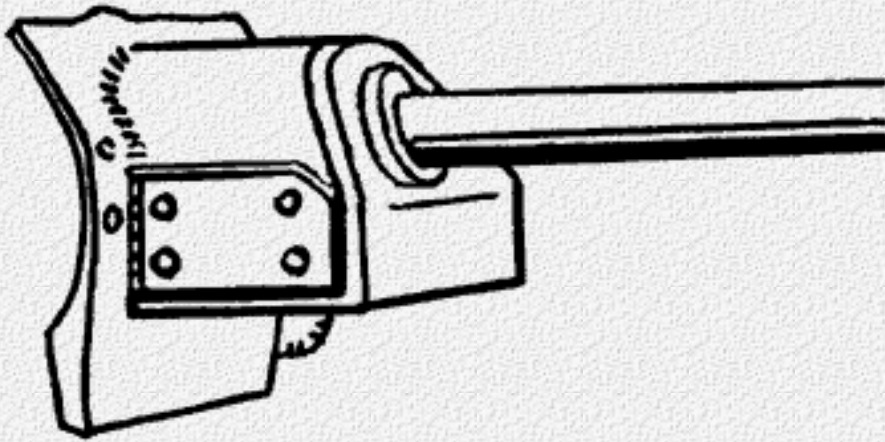


The gun mantlet of the production T-34-76.

Mass production of those guns started in August 1941. In September 1941 it was temporary delayed and on December 1, 1941, it was cancelled. That was because of shortage of 57 mm ammunition and productional expenses.

According to report of Ministry of Ammunition (Narkomat Boepripasov), in 1941 the Factory # 92 has manufactured 133 ZIS-4 guns.

Until evacuation, KhPZ had received 21 guns for rearming some production T-34s. STZ had



The gun mantlet of the T-34-57. Additional armor ring was added to compensate different diameters of the F-34 and the ZIS-4.

received 20 guns. From October 1, 1941, T-34-57 must have been manufactured on "Krasnoye Sormovo" Factory, but despite best my effort, I was unable to find any records in factory's statistic reports.

The project of 57 mm gun was resumed in 1943, when it became clear that all existing guns could not combat with German heavies. In May 1943, the "T-34 tank-hunter" and "KV tank-hunter" were accepted for service again. They

were armed with modernised ZIS-4M tank gun that distinguished from its base model by following:

- the gun received a new breech-block that was unified with F-34, ZIS-2, ZIS-3 and ZIS-5;
- the semi-automatic mechanism of the breech-block was simplified;
- the muff's fastening was improved.

The ZIS-4 wasn't provided with panoramic sight, T-34-57 was one of the first tank, that received the MK-4 periscope. Tank didn't have commander's cupola. Specially for successful combat with German heavy tanks, "tank-hunters" had "the armour piercing round of the extra power" that achieved the muzzle velocity of 1010 m/s. However, usage of that ammunition decreased significantly the barrel's life. So, after manufacturing of small party of these rounds (less than 2800 rounds total), all these ammunition was removed from mass production and withdrawn from the Red Army.

The T-34-57 in Action.



The T-34-57 of Major Lukin destroyed at Troyanovo. *(M.Baryatinsky)*

"Tank-hunters" of the first party have participated the Battle for Moscow in 1941-1942. In particular, there were 10 T-34-57 in the 21st Tank Brigade, that was formed in Vladimir. On October 14, the brigade has been deployed at Demidov rail station and a day later it was ordered to advance on Turchinovo-Pushkino-Troyanovo and make a flank strike on German troops deployed near Kalinin.

Starshiy politruk (Soviet rank) E.Gmurya drove his tank along the Volokolamsk highway had met with big column of German trucks. His tank has destroyed the whole column of 3-km length. After that, tank rushed in German aerodrome and has destroyed a heavy bomber. After that, tank was knocked out by German artillery, two crewmembers were killed. Politruk Gmyrya and sergeant Ishenko escaped and rejoined Red Army. After 4 days, 21st Tank Brigade destroyed 3 German staffs, about 1,000 soldiers, 34 tanks, 210 trucks and 31 guns. Brigade has lost its commander - Hero of the Soviet Union, major Lukin and commander of the 1st battalion Hero of the Soviet Union captain Agibalov. By November 25, all "tank-hunters" of the 21st Tank Brigade were lost.



Another photo of the Lukin's tank. *(M.Baryatinsky)*

I could find a mention about 8 T-34-57s being added to the 8th Tank Brigade on October 19, 1941. All I could find about those tanks was mention of lack of ammunition. Unfortunately, I was unable to trace their further fate.

The new T-34-57 "tank-hunters" had appeared on the frontline in August 1943. They've been attached to "special tank company 100". That company had three T-34-57s in its first platoon from August 15 to

September 5, 1943. Unfortunately, "tank-hunters" were unlucky. During all those weeks, the company would meet German tanks only once, but in that time the 1st platoon was in reserve and didn't engage the battle. So, "tank-hunters" were unable to prove their efficiency against German armours. Nevertheless, commander of that company captain Volosatov and delegate of the GABTU colonel Zaitzev, have praised T-34-57 very high

after shot practice on knocked out German tanks and captured pillboxes and bunkers.

The main drawback of the ZIS-4 and the ZIS-4M tank gun was very low quality of HE projectiles: they either exploded partially or didn't explode at all.

During 1943, the Factory #92 had manufactured 172 ZIS-4M guns, then it mass production was cancelled in favour of 85 mm guns. Although, according to factory's report on 1944, it had manufactured additional 19 ZIS-4Ms. Perhaps, for repair some existing "tank-hunters".

REFERENCES:

[The Kalinin Raid](#)

[Specification of Soviet tanks](#)

[Specifications of Soviet tank guns](#)

Sources:

"The T-34 tank. Operational manual", Voenizdat, 1941;

"The T-34 tank. Handbook", Voenizdat, 1944;

Bronekollektsiya #3, 1999;

Tankomaster #1 1999;

I.Shmelev "The T-34", Technics and Armament #11-12, 1998.

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The T-34-85 Medium Tank

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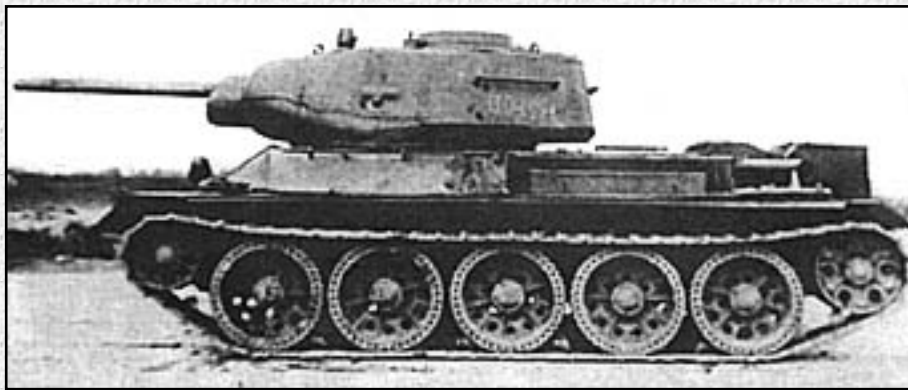


Development History

Attempts at re-arming the [T-34](#) were undertaken beginning in 1942, as the culmination of program of ongoing modernisation to eliminate the T-34's shortcomings. The [T-43 medium tank](#) design is the first such that should be mentioned here. It was designed taking into account improvements requested for the T-34: perfecting the suspension, increasing the size of the crew compartment, and improving armor protection. In addition, it made active use of the design work done on the pre-war [T-34M](#) tank.

The new combat vehicle was 78.5% interchangeable with the "thirty-four" series. The design of T-43's hull remained basically the same as the former's, as did the engine, transmission, chassis, and cannon. Despite claims that periodically occur in print, the basic difference was an increase in the frontal, side, and rear plates to 75 mm on the hull, 90 mm on the turret.

At the end of August, a conference was held at Factory #112. It was attended by the People's Commissar for Tank Industry V.A.Malyshev, Commander of Tank and Mechanized Troops of the Red Army Ya.N.Fedorenko, and ranking members from the



The T-43 medium tank

People's Commissariat for Armaments. In his introduction, V.A.Malyshev noted that the victory at the Battle of Kursk cost the Red Army a high price:

"Enemy tanks opened fire on ours at distances of up to 1,500 metres, while

our 76 mm tank guns could destroy "Tigers" and "Panthers" at distances of only 500-600 metres. Imagine the enemy has a kilometer and a half in his hands, while we have only half a kilometer. A more powerful gun needs to be put into the T-34 quickly."



The T-34-85 armed with the D-5T gun.

In actual fact, the situation was significantly worse than Malyshev painted it, though attempts to correct the situation had been undertaken at the beginning of 1943.

As early as the 15th of April, the GOKO, reacting to the appearance of the new German tanks on the Soviet-German front, published order #3187ss (the "ss" suffix means top secret) "Measures for improving anti-tank defenses."

This required the GAU (Glavnoye Artilleriiskoye Upravleniye, Chief Artillery Directorate) to put all tank and anti-tank guns then in mass production through range trials, and present findings all within a 10 day period. In accordance with this order, Deputy Commander of Tank and Mechanized Forces Lieutenant-General V.M.Korobkov ordered that a captured "Tiger" be used for the trials, which were conducted from 25 to 30 April at the NIIBT (Nauchno-issledovatel'skii Institut Bronetankovoi Tekhniki, Armored Vehicle Research and Development Institute) proving grounds at Kubinka. The trial results were of little comfort. The 76 mm armored-piercing tracer round for the F-34 gun did not

penetrate the German tank's side even as close as 200 metres! The most effective weapon for dealing with the enemy's new heavy tank turned out to be the 85mm 52-K anti-aircraft gun model 1939. It penetrated the 100 mm frontal armor at distances up to 1,000 metres.



The T-34-85 with the D-5T gun. (M.Svirin)

On 5 May 1943 the GOKO approved order #3289ss "Improving tank and assault-gun cannon armament." This gave the NKTP and NKB the specific task of designing tank gun with ballistics of an anti-aircraft gun.

The design bureau of the factory #9, headed by F.F.Petrov, had begun development of just such a cannon as far back as January 1943. By 27 May 1943, working

designs of the D-5T-85 cannon had been drawn up. It was designed along the lines of German tank/assault-gun guns and was remarkable for its low weight and light recoil. The first D-5Ts were manufactured in June. At approximately the same time, prototypes of other 85 mm tank gun were ready. The TsAKB (the Central Artillery Design Bureau, Chief Designer V.G.Grabin) submitted the S-53 gun (lead designers T.I.Sergeyev and G.I.Shabarov) and the S-50 (lead designers V.D.Meshaninov, A.M.Volgevskii, and V.A.Tyurin). Meanwhile artillery factory #92 submitted A.I.Savin's LB-85 gun. Therefore, by the middle of 1943 four 85 mm gun variants designed for a medium tank were ready for trials. But which tank?



The modernised T-34-85M armed with the S-53 gun before trials. 1945. (M.Svirin)

The T-43 rapidly ceased to be relevant. With the 76 mm gun the vehicle weighed 34.1 tons. Mounting a more powerful, and consequently, heavier gun would entail a further weight increase with all the ensuing negative consequences. In addition, switching over factories to production of the new tank, even one having much in common with

the T-34, would unavoidably cause a drop in production capacity. And production was sacred! As a result, the T-43 did not begin mass manufacturing. In 1944, an 85 mm gun

was mounted on it as a test procedure anyway, and with that the program ended.

In the meantime, the D-5T gun was very successfully mated to the promising "IS" heavy tank. Mounting that same D-5T gun in the T-34 medium tank required increasing the turret ring diameter and mounting a new turret. Working on this problem were KB factory "Krasnoye Sormovo" headed by V.V.Krylov and a turret group at factory #183 led by A.A.Moloshtanov and M.A.Nabutovskii. The results were two similar cast turrets with a ring diameter in the neighborhood of 1,600 mm. They were both reminiscent (but not copied from) the prototype T-43 tank turret, which was used as the basis for design.



The D-5T mount. *(M.Svirin)*

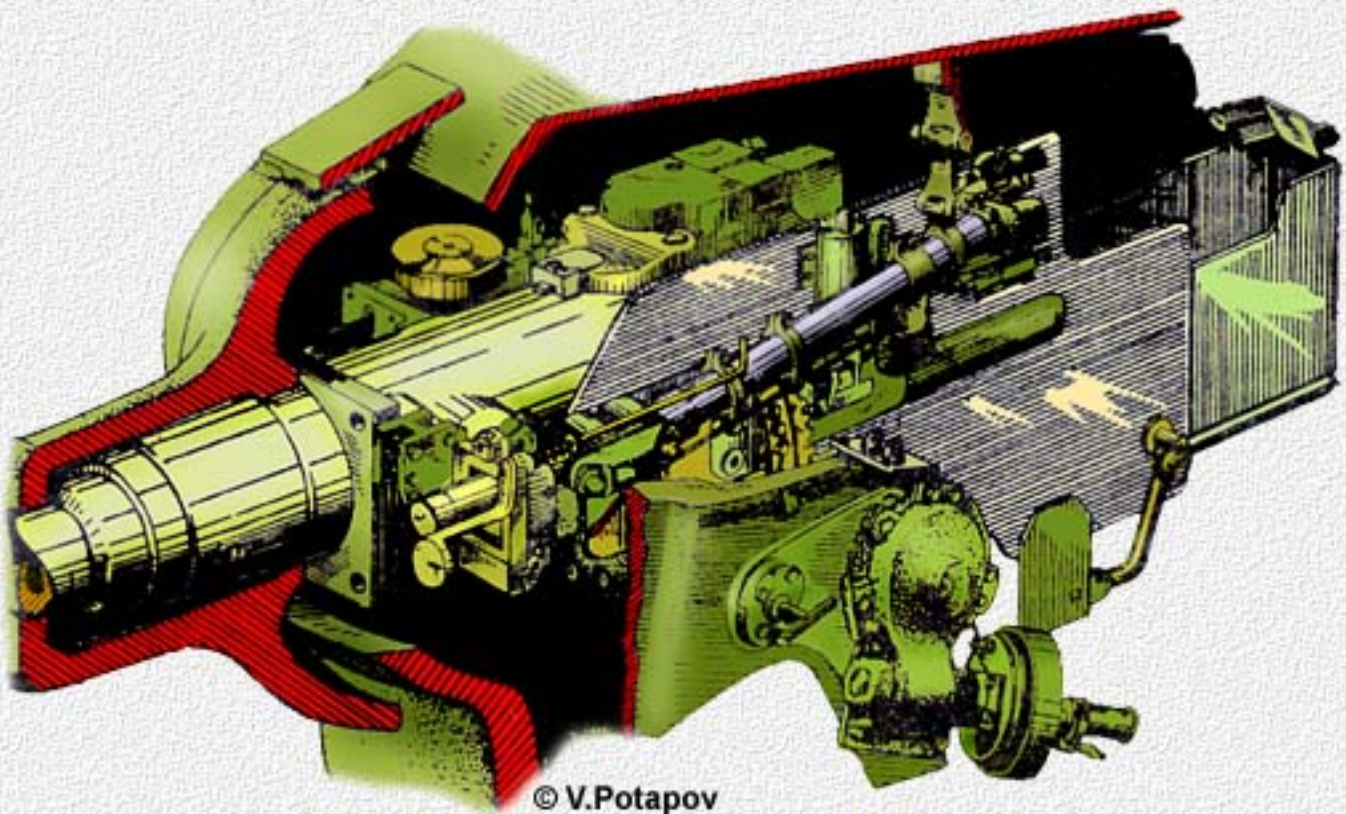
The course of development was negatively affected by the TsAKB's promise to install the 85 mm S-53 gun in the standard T-34 turret with its 1,420mm turret ring diameter. V.G.Grabin got factory #112 to allot him a production tank. The TsAKB recast the forward part of the turret; specifically, the gun trunnion was moved forward 200 mm. Grabin attempted to have his design approved by V.A.Malyshev. The latter, however, had serious doubts regarding the expediency of such a decision, the more so because trials of the new gun in the old turret, conducted at the Gorokhovetsk proving grounds, ended unsuccessfully. Two men, in what had become an even more cramped turret, could not effectively operate the weapon. The ammunition load was also sharply decreased. Malyshev ordered M.A.Nabutovskii to fly out

to factory #112 and inspect everything. At a special conference attended by D.F.Ustinov and Ya.N.Fedorenko, Nabutovskij thoroughly criticized Grabin's project. It had become apparent that there was no alternative to widening the turret ring.

In addition to this it was also clear that the S-53 gun, which had won the competitive trials, could not be installed in the Sormovo designed turret. Installing the gun in this turret limited its elevation. What was needed was to change the turret's design, or to use

a different gun, for example, the D-5T, which could easily be mated to the Sormovo turret.

According to plan, the "Krasnoye Sormovo" factory was to have produced 100 T-34 tanks with the D-5T gun by the end of 1943. However, the first vehicles of this type managed to leave the workshops only at the beginning of January 1944. This was, in fact, before the official acceptance of the new tank. The GOKO order #5020 (top secret), in accordance with which the T-34-85 was accepted by the Red Army, saw the light of day only on 23 January 1944.



The ZIS-S-53 gun mount. (V.Potapov)

The tanks, armed with the D-5T gun, were noticeably different from vehicles produced later, both in external appearance and in internal construction. It had a two-man turret and a four-man crew overall. The commander's cupola, with a two-leafed folding hatch and revolving on a ball-bearing support, had been moved sharply forward. An MK-4 observation periscope, permitting an all-around field of view, was mounted on the turret roof. The gun and coaxial machine-gun were fired using the TSh-15 telescopic elbow sight and the PTK-5 panoramic telescope. Both sides of the turret had an observation slit covered with triplex glass. The radio was located in the hull with its antenna lead on the right side, exactly the same as on the T-34. The ammunition load consisted of 56 shells and 1,953 machine-gun rounds. The power plant, transmission, and chassis underwent practically no changes. These tanks differed among themselves dependent on when they were produced. For example, early-production vehicles had one turret ventilator, while

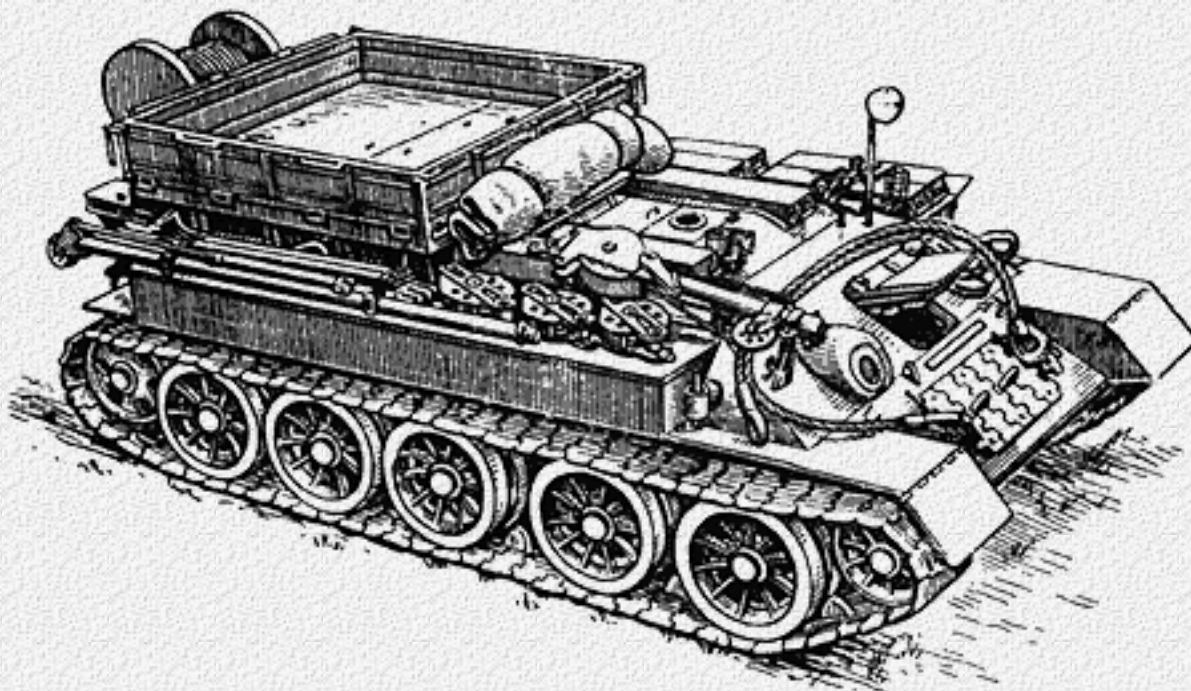
most of those produced later had two.



The T-34-85 of the "Krasnoye Sormovo" factory armed with the ZIS-S-53 gun.

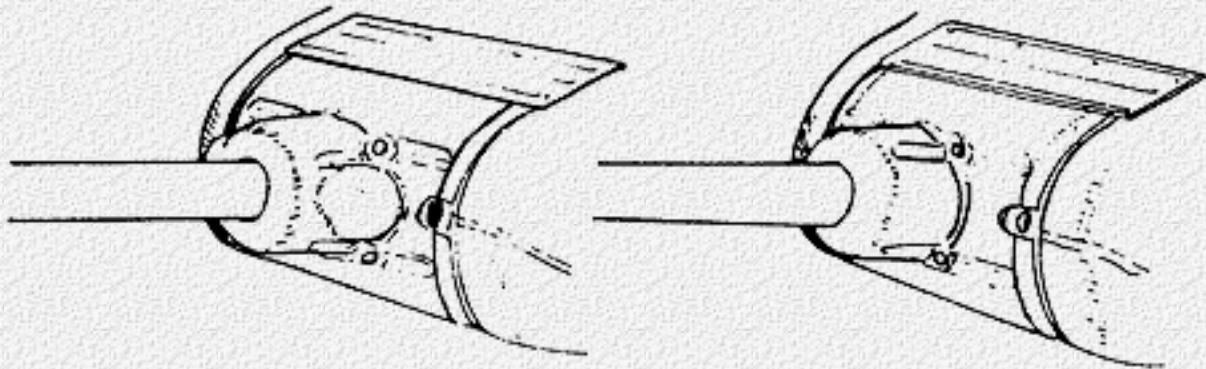
(M.Baryatinsky)

It should be noted that the model examined above did not, apparently, figure into statistical accounting as a T-34-85. In any case, at the present time, there exist significant discrepancies in the literature regarding estimates of the quantity of vehicles produced. The basic figure varies in a range of 500-700 tanks. In actual fact, the number was significantly lower. This can be shown by the fact that in 1943, 283 D-5T guns were produced, 260 in 1944, 543 in all. Of this number, 107 guns were used in [IS-1](#) tanks, a 130 (not more than 100 according to other sources) were used in KV-85 tanks, and a few more were used in vehicle prototypes. Therefore, the number of T-34 tanks produced with the D-5T gun is close to 300 vehicles.



The fully equipped T-34T prime mover.

As far as the S-53 gun was concerned, its installation in the Nizhnij Tagil turret did not cause any difficulties. The S-53 was accepted by the Red Army on 1 January 1944, by GOKO order. Start-up production of these guns began in March, full-scale production in May. Correspondingly, in March, the first T-34-85 tanks armed with the S-53 left the shop floor of the Factory #183 in Nizhnij Tagil. Following this lead, the Factory #174 in Omsk and #112 "Krasnoye Sormovo" began production of these vehicles. During this time, a portion of the Krasnoye Sormovo vehicles were equipped with the D-5T gun as before.



Mantlets of various guns: for the S-53 (left) and for the ZIS-S-53 (right)

Field trials, which continued despite the beginning of production, revealed significant defects in the S-53's recoil mechanism. Artillery factory #92 in Gorkii was ordered to put the finishing touches on it unaided. In November - December 1944, production of this gun began under the designation ZIS-S-53 ("ZIS" was the code for the #92 Stalin Artillery Factory, "S" was the TsAKB's code.). In all, 11,518 S-53 and 14,265 ZIS-S-53 guns were produced in 1944-1945. The latter was installed in both the T-34-85 and the T-44 tanks.



The self-propelled hoisting crane SPK-5.

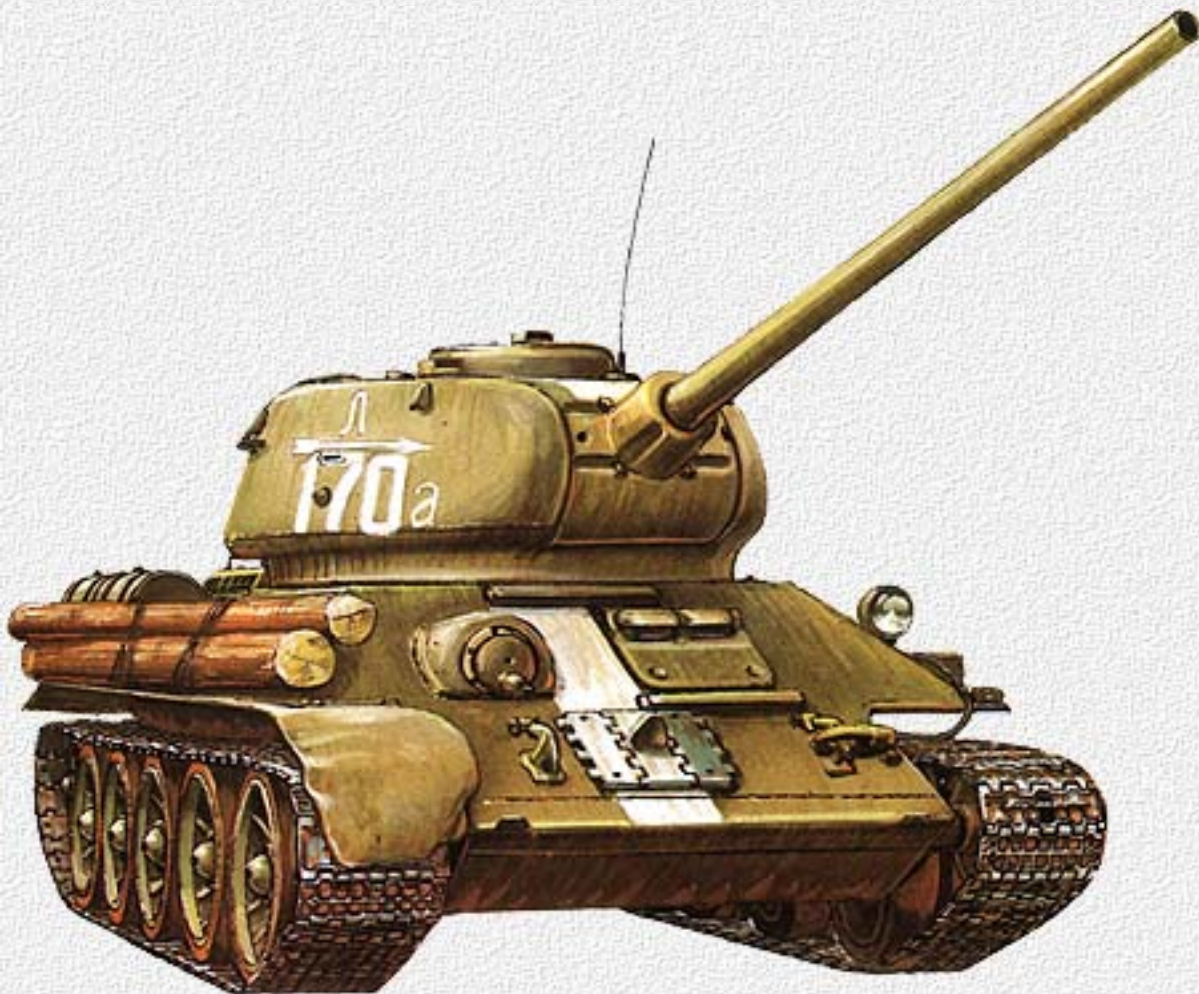
(M.Baryatinsky)

The "thirty-fours" with the S-53 or ZIS-S-53 gun had three-man turrets, with the commander's cupola moved farther to the rear. Only the new MK-4 type observation device was installed. The commander's PTK-5 panoramic telescope was removed. The engine had been taken care of as well: the "Cyclone" air filters had been replaced with the more efficient "Multi-cyclone" type. The tank's remaining systems and assemblies were practically untouched.

Just as with the T-34, there were some differences among T-34-85 tanks connected with the manufacturing technologies available to the various factories. Turrets differed in the number and placement of the casting joints, as well as the shape of the commander's cupola. The chassis utilized both stamped road wheels, as well as cast ones with internal shock absorption.

In January 1945, the two-leafed hatch on the commander's cupola was replaced with a one-leaf hatch. In late production tanks ("Krasnoye Sormovo" factory), one of the two ventilators installed at the rear of the turret was moved to the central portion, allowing for better ventilation of the crew compartment.

At the end of the war, attempts were made to improve the tank's armament. In 1945, prototype [T-34-100](#) tanks, with the turret ring widened to 1,700mm and armed with 100 mm LB-1 and D-10T guns, underwent field trials. This project had little purpose in so far as the new T-54 medium tank with the 100 mm D-10T gun had already been accepted for service.



The T-34-85 of the 4th Guards Tank Brigade of the 2nd Guards Tank Corps of the 3rd Buelorussian Front. Eastern Prussia, 1944.

In September 1944 the design bureau of the factory #92 offered "the new 85-mm gun ZIS-

85-PM of increased power" with muzzle velocity of an AP projectile 980 m/s. The gun passed factory trials, but didn't pass the governmental trials on the Gorokhovetsky proving ground. Being too expensive the gun was considered as unsuccessful and ineffective. One more attempt to improve the T-34-85's armament was undertaken in 1945, when the TsAKB developed a modification to the ZIS-S-53, the ZIS-S-54, equipped with a single-plane gyroscopic stabilizer. This gun system, however, did not enter mass production. In spring 1945, all further tests with 85-mm tank guns were ceased because the 85-mm caliber was considered as "having no prospects". The more favorable 100-mm caliber was chose.

In the spring of 1944, prototypes of the AT-45 heavy tractor, designed to tow guns up to 22 tons in weight, were manufactured at the former #183 factory, now rebuilt after the liberation of Kharkov and redesignated #75. The AT-45 was designed based on the T-34-85. It was equipped with the same V-2 diesel, though power was decreased to 350 h.p. at 1,400 rpm. The factory built six AT-45 tractors in 1944. Of these, two were sent to the army to be tested in combat conditions. Tractor production ceased in August 1944, in connection with factory #75's preparations to produce the new medium tank model, the [T-44](#). It would not be superfluous to note that this tractor was not the first to be based on the "thirty-four." As far back as August 1940, the AT-42 artillery tractor design was approved. It weighed 17 tons and had a platform carrying capacity of 3 tons. With its 500 h.p. V-2 engine, it could make 33 km/h while towing 15 tons. AT-42 prototypes were manufactured in 1941, but further work on testing and production was cut short by the factory's evacuation from Kharkov.

Mass manufacturing of the T-34-85 in the Soviet Union ceased in 1946 (according to some sources, small-scale production continued at the "Krasnoye Sormovo" factory until 1950). As far as the total number of T-34-85 tanks produced at one or another factory, here, just like for the T-34, there exist areas of considerable discrepancy in the numbers cited in various sources.

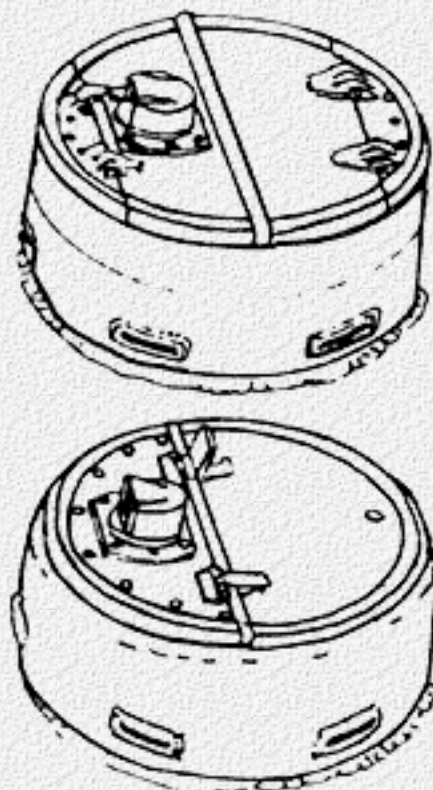
Table 1. The summary output of T-34-85 tanks.

Year	1944	1945	Total
T-34-85	10 499	12 110	22 609
T-34-85 commander	134	140	274
OT-34-85	30	301	331
Total	10 663	12 551	23 214

Table 2. The summary output of T-34-85s by NKTP's factories

Factory	1944	1945	1946	Total

# 183	6 585	7 356	493	14 434
# 112	3 062	3 255	1 154	7 471
# 174	1 000	1 940	1 054	3 994
Total	10 647	12 551	2 701	25 899



Commander's cupolas: the two-hatch model 1944 (above) and the single-hatch model 1945 (below)

Comparing figures from the two tables, the discrepancy in the quantity of tanks produced in 1944 is obvious. And this is in spite of the fact that the tables are made up of the most frequently encountered and most reliable figures. In a range of sources, it is possible to encounter other figures for 1945: 6208, 2655, and 1540 tanks respectively. However, these figures reflect tank production for the 1st, 2nd, and 3rd quarters of 1945, meaning at approximately the end of the Second World War. The discrepancy in the figures does not permit the opportunity to state for certain how many T-34 and T-34-85 tanks were produced from 1940 to 1946. The number varies from 61,293 to 61,382 vehicles.

Foreign sources cite the following figures for T-34-85 production in the USSR in the post-war years: 1946-5500, 1947-4600, 1948-3700, 1949-900, 1950-300 vehicles.

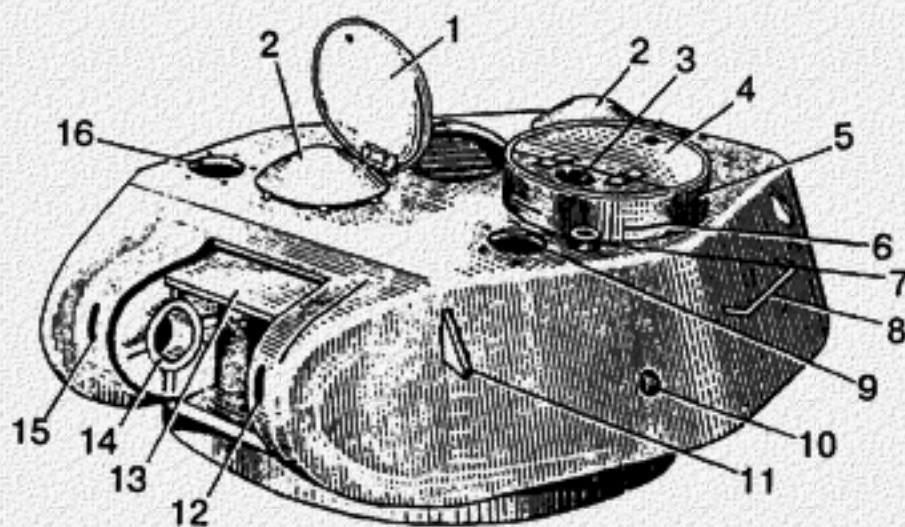
Judging by the number of zeros, the figures are most likely very approximate in character. If, in these sources, the quantity of vehicles produced in 1946 is taken to be inflated by a factor of two, and it is assumed that the remaining figures are likewise inflated, it turns out that 4,750 T-34-85s were produced in 1947-1950. Indeed, this looks like the truth. In fact, is it really possible to surmise that our tank industry stood idle for almost five years? Production of the T-44 was ended in 1947, while factories started mass production of the new T-54, for all practical purposes, only in 1951. As a result, the quantity of T-34s and T-34-85s manufactured exceeds 65 thousand.

The majority of the tank's components and assemblies were borrowed from the T-34-76, so I will not dwell in detail on a description of the construction. You may read about that [in the separate article](http://www.battlefield.ru/t34_85.html). Here I will touch briefly only on the hull and turret of the T-35-85.

The hull

The hull of the tank, as compared with the T-34, did not undergo any fundamental changes. They may all be reduced down to construction simplification. The girder in the bow was removed and the upper and lower frontal plates were joined with a weld. Grommets (hooks) for attaching spare tracks were welded to the upper plate. The aperture for the antenna lead on the upper right plate was removed. Brackets for attaching BDSH smoke pots were fixed to the upper rear plate. Despite claims that periodically occur in print, the armor on production T-34-85's front hull remained unchanged at 45 mm (I have encountered quotes of 60 mm, 75 mm, and even 90 mm). In reality, the armor was increased only on the new turret, to 90 mm.

The turret



The T-34-85 turret:

1. The loader's hatch;
2. The ventilator's armored lid;
3. The hole for further installation of the commander's observation sight;
4. The commander's hatch;
5. The commander's cupola;
6. The observation slit;
7. The antenna's hole;
8. The hand-rail;
9. The hole for the gunner's observation sight;
10. The pistol port;
11. The eye-bolt;
12. The hole for the telescopic sight;
13. The visor;
14. The hole for the gun's trunnion;

It consisted of a shaped steel casting. The front had an embrasure for mounting the gun, the coaxial machine-gun, and sight. Externally, four eye-bolts and three handrails were welded to the turret's walls, and six brackets for attaching tarpaulins were welded to the turret's rear wall. One firing port, closed off with an armored cover and latch, was located in each wall of the turret. Early production tanks with the D-5T gun had observation slits above the firing ports; in vehicles produced in 1944-1945, only the observation slit on the right side of the turret, at the loaders position, was kept. T-34-85s produced after the war had no observation slits in the turret.

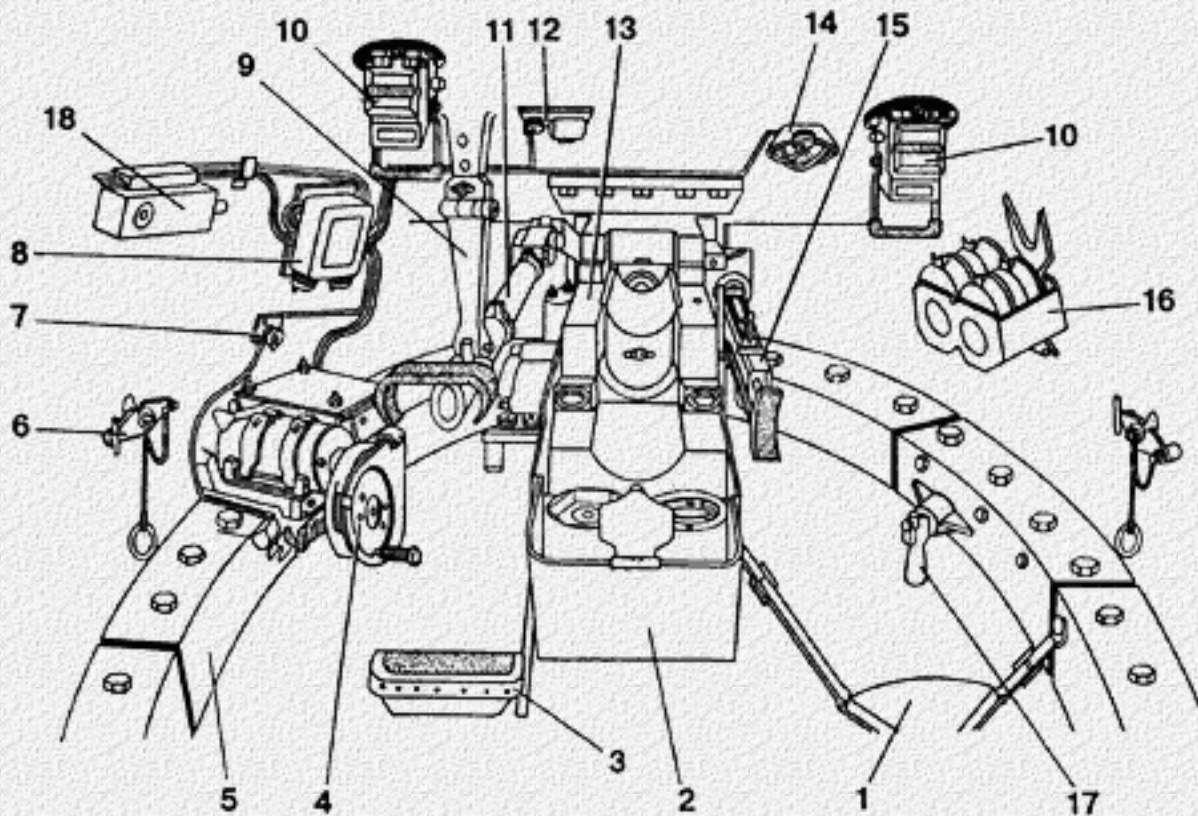
The cast cylindrical commander's cupola was located on the left side of the turret roof. Five observation slits, covered with protective glass, were cut into the cupola's sides for all around vision. The cupola,

15. The hole for the machine-gun;
16. The hole for the loader's observation sight

which could rotate on ball bearings, had a two-leafed folding hatch with an aperture for the

observation scope in one of the halves. In tanks produced in 1945-1946, the cupola had a one-leaf hatch and the observation scope was placed in the fixed part of the cupola roof.

The loader's round hatchway, with its hatch, was located to the right of the cupola. In addition, the turret had two apertures for mounting the gunner's and loader's MK-4 observation scopes, as well as two ventilation hatches covered with armored caps welded to the turret roof. The crew compartment's ventilators were installed beneath these. The turret was rotated by an electric traverse motor, or by hand. Using the electric motor, maximum turret traverse was 4.2 rpm.



The turret of the T-34-85:

1. The loader's station;
2. The cartridge bag;
3. The gunner's station;
4. The turret traversing mechanism;
5. The turret ring;
6. The pistol port's stopper;
7. The backlight button for the gun's deflection;
8. The electrical control unit;
9. The telescopic sight holder;
10. The MK-4 observation sight;
11. The The TNSh-16 telescopic sight;
12. The backlighting for the TNSh-16;
13. The gun;
14. The illumination lamp;
15. The coaxial machine-gun;
16. Machine-gun magazines;
17. The turret locking mechanism;
18. The TPU communication device.

Armament and equipment

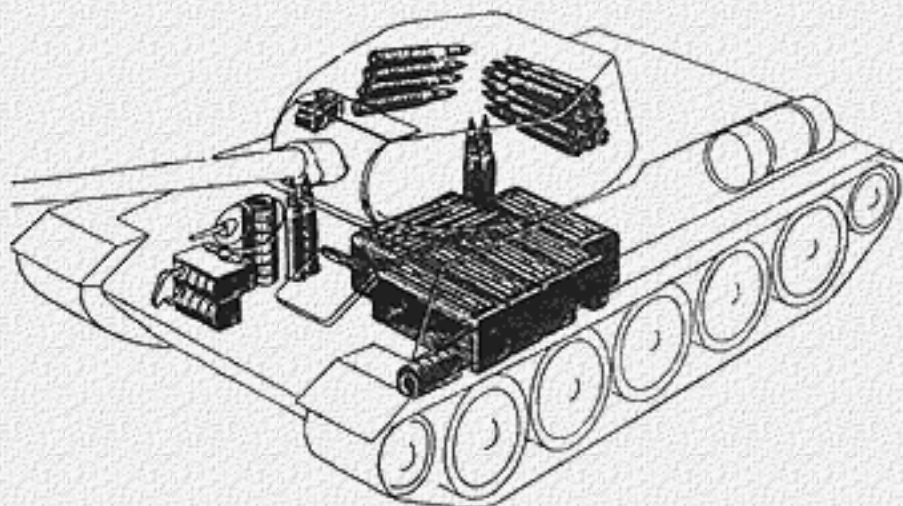
Early production tanks were equipped with an 85mm D-5T (or D-5-T85) gun 48.8 calibers long (according to other sources, 52 calibers long). The gun's weight was 1,530 kg. Maximum recoil was 320 mm. The gun had a semi-automatic sliding-wedge breech block like the breech block on the F-34 gun. The recoil mechanism consisted of a hydraulic recoil brake and a hydropneumatic recuperator located above the barrel; the recuperator on the right, the recoil brake on the left.

Table 3. Specifications of the D-5T and the ZIS-S-53 tank guns

Parameter	D-5T	ZIS-S-53
Caliber, mm	85	85
Barrel length, clb	51.6	54.6
Weight of recoil elements, kg	980	905
The trunnion weight, kg	1500	1150
Max. recoil, m	0.33	0.33
Elevation	- 5° + 22°	- 5° + 25°
Practical rate of fire, shots/min	5-8*	6-10

Note:

The max ROF during movement was 4 shots/min, the max ROF in static was 10 shots/min.



The ammo layout of the T-34-85

From March 1944 the 85mm S-53 (ZIS-S-53 from the summer of 1944) model 1944 gun 54.6 calibers long was mounted on the T-34-85 tank. The trunnion weight of the gun without the mantlet was 1,150 kilos. The gun had a semi-automatic vertical sliding-wedge block breech. The triggering mechanism consisted of both electric and mechanical (manual) triggers. The electric trigger was on

the elevation flywheel handle, and the manual trigger was on the gun's left safety shield. The tank was equipped with two 7.62 mm DT machine-guns. One was coaxial to the gun, and the other in a ball mount in the front plate of the hull.

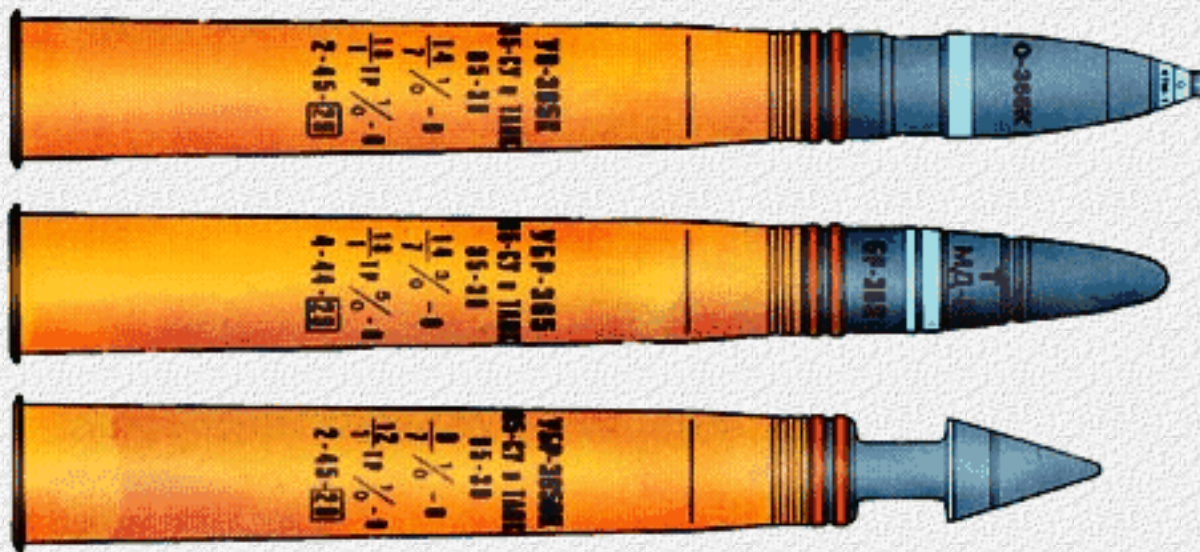
For direct fire with the D-5T gun, the TSh-15 telescopic sight and the PTK-5 periscopic sight were used. With the S-53 gun, the TSh-16 telescopic sight was used.

Since all 85 mm tank guns were based on anti-aircraft guns, they used standard rounds for the 85 mm model 1939 anti-aircraft gun:

Table 4. Ammunition for the T-34-85 (with any gun)

Round index	Projectile index	Type	Fuse	Projectile weight, kg	Description
UO-365K	O-365K*	fragmentation	KTM-1	9.54	steel case
UBR-365	BR-365	armor-piercing (APHE)	MD-5 or MD-7	9.2	steel case; tracer
UBR-365K	BR-365K	armor-piercing (APBC)	MD-8	9.2	-
UBR-365P	BR-365P	sub-caliber	n/a	4.99	introduced in February 1944

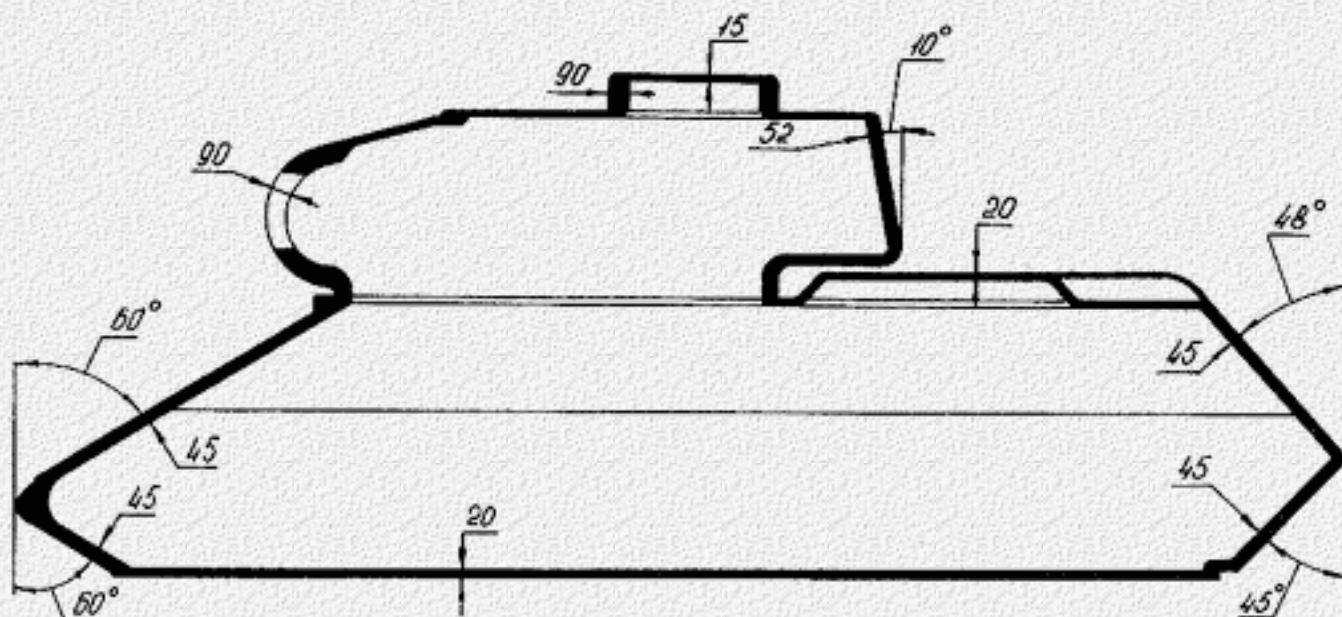
** PLEASE NOTICE: the T-34-85 didn't used any high explosive or high-explosive fragmentation projectiles! Only pure fragmentation ammunition used.*

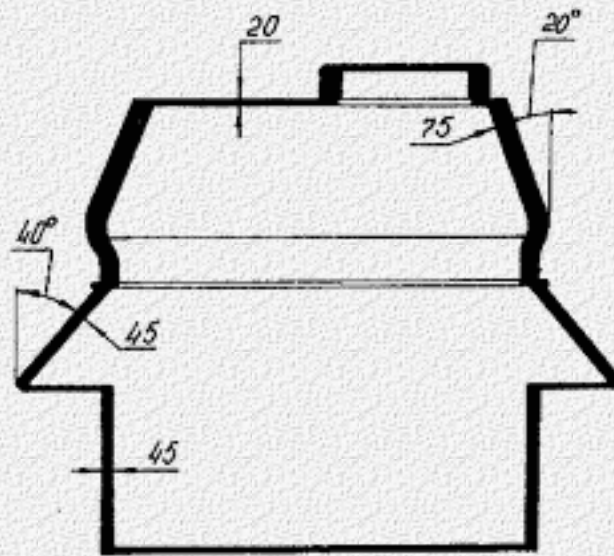


Ammunition used for the T-34-85:

- the UO-365 fragmentation shell;
- the UBR-365 armor-piercing shell;
- the UBR-365P armor-piercing subcaliber shell.

The gun's basic load consisted of 55 gun shells (36 high-explosive, 14 armored piercing, and 5 sub-caliber), and was placed in the hull and turret using three different types of stowage: racks, clamps, and crates (see drawing).





REFERENCES:

[T-34 construction features](#)

[The T-34-85 in action](#)

[Specification of Soviet tanks](#)

[Specifications of Soviet tank guns](#)

Translated by:

[*Douglas Rauber*](#)

Sources:

"The T-34 tank. Handbook", Voenizdat, 1944;

"Reference for maintaining the T-34-85 tank", Voenizdat, 1960;

"Artillery armament of the Soviet tanks 1940-1945" Armada #4, 1999;

I.Shmelev "The T-34 tank", Weapons and Armament #11-12 1998;

"Bronekolleksiya" #1 1998, #4 1999;

"Soviet tanks in combat 1941-1945. The T-28, T-34, T-34-85 and T-44", Concord publ. company

S.Zaloga, J.Grandsen "T-34 in action"

J.Magnuski "Wozy bojowe", LWP, Warsaw, 1985;

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The T-34-85 Medium Tank

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The T-34-85 in Action

T-34-85 tanks began to reach the troops in February-March 1944. Specifically, this was about the time that formations of the 2nd, 6th, 10th, and 11th Guards Tank Corps received them. Unfortunately, the initial effect of the new tanks' use in combat was not great, because the brigades received only a few vehicles each. They still consisted largely of "thirty-fours" with 76mm gun. In addition, there was very little time in combat units for re-training crews. M.E.Katukov, who commanded the 1st Tank Army during April 1944 when it was engaged in heavy fighting in the Ukraine, wrote about precisely this problem in his memoirs.

"We lived through difficult days and happy minutes. One of these was the arrival of new replacement tanks. The army received, in small numbers true, new "thirty-fours." They were armed not with the

usual 76mm, but with an 85mm gun. The crews that got the new tanks were given only two hours for familiarization on them. We couldn't give them more time. Conditions at the over-extended front meant that the new tanks, with their more powerful armament, had to be sent into action as soon as possible."



The column of T-34-85 tanks of the 38th Independent Tank Regiment. The "Dmitrij Donskoj" is painted on their turrets. (*Federal Archive*)

The first T-34-85s with their D-5T gun went to the 38th Independent Tank Regiment. This unit possessed a mixed complement: in addition to T-34-85s, it also had OT-34 flamethrower tanks. All of the regiment's combat vehicles were paid for by the Russian Orthodox Church and bore the title "Dmitrij Donskoj" on their sides (Dmitrij Donskoj is Russian national hero, he was the Grand Prince of Moscow who defeated a Mongol Horde in 1380 at the Battle of Kulikovo Field). In March 1944, the regiment became part of

the 53rd Combined Arms Army and participated in the liberation of Ukraya.

It should be noted that in the course of re-equipping tank brigades, a few organizational changes took place as well. Since a T-34-85 crew consisted of five men, the personnel contingent of the anti-tank gun company assigned to the brigade's submachine-gun battalion was converted in order to fill out the crews.

Until the middle of 1945, Soviet tank units stationed in the Far East were armed largely with obsolete BT and T-26 light tanks. By the beginning of the war with Japan, these units had received 670 T-34-85 tanks. This permitted the first battalions in all independent tank brigades, and the first regiments in tank divisions, to be equipped with them. For example, the 6th Guards Tank Army, transferred to Mongolia from Europe, left its vehicles in its former deployment (Czechoslovakia), and received 408 T-34-85 tanks from factories #183 and #174 on the spot. In this fashion, these vehicles directly participated in the rout of the Kwangtung army, comprising as they did the tank formations' striking power.



The T-34-85 medium tank of the 36th Tank Brigade of the 11th Tank Corps. Berlin. April 30, 1945.

In addition to the Red Army, T-34-85 tanks equipped the armies of several other countries participating in the anti-Nazi alliance.



The T-34-85 crew savors the victory in front of Branderburg Gates. Despite all western claims, the Russians did not use bedsprings as protection against German Panzerfausts and

A T-34-85 with the D-5T gun was the first of this type used in the Polish Army. It was delivered on 11 May 1944 to the 3rd Tank Training Regiment of the 1st Polish Army. As regards combat units, the 1st Polish Tank Brigade was the first to receive these tanks, 20 vehicles in September 1944 after the fighting around Studzyanki. In all, Polish forces received 328 T-34-85 tanks from 1944-1945 (the last 10 vehicles were delivered on 11 March). The tanks were supplied by factories No. 183, and No. 112, and from repair depots. A significant number of vehicles were lost in the course of combat operations. On 16 July 1945, 132 T-34-85 tanks were reported present in the Polish army.

All these vehicles were completely worn-out and needed overhaul. Special brigades had been formed to do this. In areas where there had been recent fighting, they removed the still working components and assemblies from knocked-out Polish, as well as Soviet, tanks. It is interesting to note that, in the course of repair, several hybrid vehicles made an

Panzerschrecks. The Soviet industry manufactured various shields instead. On this photo you can see a kind of shield made of 8-mm wire. (RGAKFD)

appearance when the armor plate beneath the turret of an earlier production T-34 would be modified, and a turret with an 85 mm gun installed.

The 1st Independent Czechoslovak Brigade received T-34-85s at the beginning of 1945. At that time it was composed of 52 T-34-85s and 12 T-34s. The brigade, operationally subordinated to the Soviet 38th Army, took part in the heavy fighting for Ostrava. After the city of Olomouc was taken on 7 May, the brigade's 8 remaining operational tanks were transferred to Prague. The number of T-34-85 tanks delivered to Czechoslovakia in 1945 ranges in various sources from 65-130 vehicles.

Two tank brigades were formed in the People's Liberation Army of Yugoslavia in the final stages of the war. The 1st Tank Brigade was equipped by the British. Its M3A3 light tanks were landed on Yugoslavia's Adriatic coast in July 1944. The 2nd Tank Brigade was formed with the help of the Soviet Union in 1944 and received 60 T-34-85 tanks.

An insignificant number of T-34-85 tanks were captured by German forces as well as by forces of states allied to Germany. The tanks, which were used by the Wehrmacht, were generally isolated individuals. This is understandable, in 1944-1945 the field of battle was left to the Red Army in the majority of cases. The fact that individual T-34-85s were used by the 5th SS Panzer Division "Viking," the 252nd Infantry Division, and a few other units, is well known and well established. As far as Germany's allies, in 1944 the Finns, for example, captured nine T-34-85s, six of which were used by the Finnish army until 1960.



The T-34-85 in conquered Berlin. Notice a captured MP-40 on the turret side. (M.Baryatinsky)

captured vehicle became the brigade's first T-34-85 tank.

As often happens in war, military equipment sometimes changed hands a few times. In the spring of 1945, the 5th Guards Tank Brigade, fighting as part of the 18th Army on Czechoslovak territory, captured a T-34-85 medium tank from the Germans. It is interesting to note that, at that moment, the brigade's equipment consisted of T-70 light tanks, T-34 mediums, and a battalion of captured Hungarian tanks. The

After the conclusion of the Second World War, the T-34-85 formed the basis of the

Soviet army's tank park for quite some time, almost until the mid 50's.

Outside the borders of the Soviet Union, the T-34-85 took part in combat operations on practically every continent, up to the very recent past. Unfortunately, it is not possible to give the precise number of these tanks delivered to one or another country, the more so because deliveries were made not only by the USSR, but also by Poland and Czechoslovakia.



The T-34-85 and its crew in Berlin. May 1945. (RGAKFD)

In essence, the T-34-85 medium tank represented a significant modernisation of the T-34 tank, resulting in the elimination of the latter's major deficiency: the cramped crew compartment that prevented a proper division of labor among crew members. This was accomplished by increasing the turret ring diameter, and also installing a new, three-man turret with significantly larger dimensions than that on the T-34. The design and arrangement of the hull components and assemblies did not undergo any significant changes because of this. Consequently, some deficiencies, characteristic of vehicles with a rear located engine and transmission, remained.

In addition to this, the turret ring diameter, if the shape of the hull was to be kept unchanged, reached its practical limits on the T-34-85. This prevented mounting a larger gun system in the turret. The potential for modernising the tank's armament had been completely exhausted in comparison, for example, with the American

"Sherman" and the German Pz-IV. At the same time, the problem of increasing the caliber of the tank's main armament was of paramount significance. It is sometimes asked why it was necessary to change to an 85mm gun, couldn't the ballistic characteristics of the F-34 gun be improved by lengthening the barrel? The Germans had done exactly this with the 75mm gun on their Pz-IV.

The answer is that German gun have been traditionally characterized by excellent interior ballistics (our barrels traditionally by exterior ballistics). The Germans obtained high armor-piercing capability by increasing muzzle velocity and using high-quality ammunition. We could only reply adequately by increasing caliber. Although the S-53 gun significantly increased the T-34-85's firepower, all attempts at designing an 85mm gun with a muzzle velocity higher than 1000 meters per second, a so-called high

velocity gun, ended in failure. The reason being rapid wear and destruction of the barrel while still at the testing stage. Knocking out German tanks in a "duel" required changing to the 100mm caliber, as on the T-54 with its 1815mm turret ring diameter.



An American officer inspects a tank brigade of T-34-85 in Austria. May 1945. *(Federal Archive)*

The absence of a rotating turret basket in the crew compartment was a consequence of the layout. In action, the loader worked while standing on the top of the ammunition crates stowed in the bottom of the tank. When the turret rotated, he had to move alongside the breech ring, and was hindered in doing so by the spent cases piled up there on the floor. During intensive firing, the piled-up cases made it difficult to get to the shells in their combat

stowage in the bottom.

In considering the virtues and deficiencies of the T-34-85, one more very important factor should be taken into account. The daily life of any tank crew is, as a rule, completely undisturbed by the slope of the frontal armor or other hull or turret plates. While contemporary tank "aficionados" love to engage in silly arguments on these themes, they do not understand that what is significantly more important is that the tank, as a vehicle, that is, as the sum of its mechanical and electrical parts, runs smoothly, hopefully without problems while being used. Included in this are issues connected with repair and replacement of various parts, assemblies, and components. For the T-34-85 (just as for the T-34-76), everything was in order on exactly this point. The tank was distinguished by an exceptional ease of repair.



The T-34-85 and its Serbian crew. Bosnia, 1995. (ITAR-TASS)

There is a rule: Do not design for easy installation and removal of the components; and following from this: complete removal of the components should not be necessary during repair. The needed high operating reliability and dependability is attained by designing the tank using off-the-shelf, design-perfected components. In so far as practically not a single one of the T-34s components met this requirement, it was laid out contrary to this rule. The roof on

the engine/transmission compartment was detachable, the rear hull plate folded back on hinges. This permitted easy removal of such large components as the engine and the gearbox under field conditions. This all had colossal significance in the first half of the war, when more tanks were put out of service by mechanical malfunction than by enemy action (on 1 April 1942, for example, the army in the field had 1642 functioning and 2409 non-functioning tanks of all types. At the same time, our combat losses for March consisted of 467 tanks). In as much as the quality of components was increased, achieved to the highest degree in the T-34-85, the significance of a layout that made for easy repair was decreased, but one hesitates to call this a deficiency. More than that, the ease of repair turned out to be quite fortuitous in the course of its post-war use abroad, predominantly in Asia and Africa, at times in extreme climatic conditions, and with personnel that had an extremely mediocre, to say the least, level of training.



The T-34-85 with the D-5T gun of the 119th Rifle-Tank Regiment of the 2nd Ukrainian Front. March 1944. On 19 March 1944 this regiment was the one of the

first unit that was re-equipped with the new T-34-85 tanks.

The presence of all the deficiencies in the "thirty-four's" design was the result of balancing compromises. These profitably distinguished this combat vehicle from other tanks of the Second World War. Simplicity, ease of use and mechanical maintenance, combined with good armor protection, maneuverability and sufficiently powerful armament were the reasons for the T-34-85's success and popularity among tankers.



REFERENCES:

[Development history of the T-34-85](#)

[T-34 construction features](#)

[Specification of Soviet tanks](#)

[Specifications of Soviet tank guns](#)

Translated by:
[Douglas Rauber](#)

Sources:
"Reference for maintaining the T-34-85 tank", Voenizdat, 1960;
"Artillery armament of the Soviet tanks 1940-1945" Armada #4, 1999;
I.Shmelev "The T-34 tank", Weapons and Armament #11-12 1998;
"Bronekolleksiya" #4 1999;
"Soviet tanks in combat 1941-1945. The T-28, T-34, T-34-85 and T-44", Concord publ. company
S.Zaloga, J.Grandsen "T-34 in action"
J.Magnuski "Wozy bojowe", LWP, Warsaw, 1985;
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The T-44 Medium Tank

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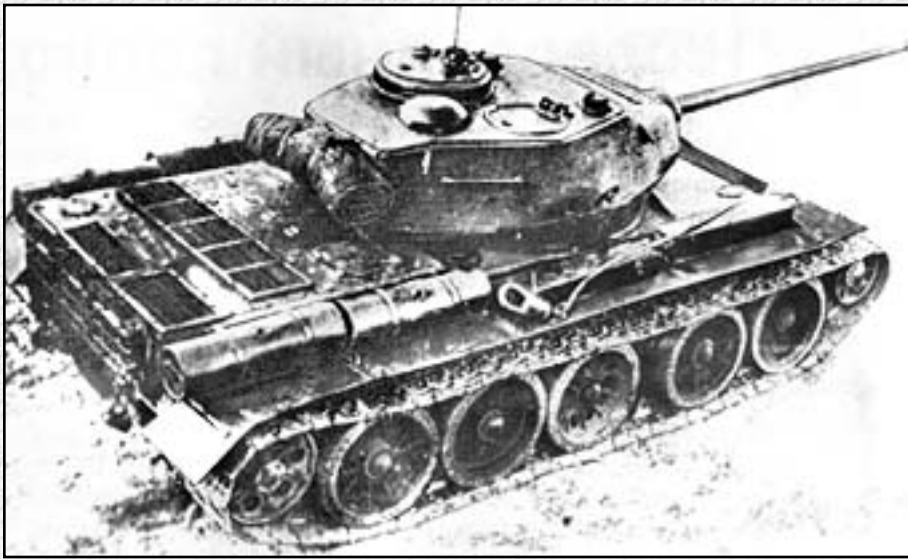


The T-44 medium tank wasn't in large-scale producing like the [T-26](#) or so widespread in use like the [T-34](#), also it wasn't the main battle tank for the post-war period like the T-54/55, but it took a worthy place in the history of Soviet tank development.



The production T-44 medium tank.

From the end of 1943 on, work on the new project T-44 started from the design bureau of the factory #183 (Chief engineer A.A.Morozov). Of course many elements of the famous T-34 were used for the new T-44 tank, but simultaneously two another tanks influenced the T-44 design: the [T-34M](#) and the [T-43](#).



The prototype of the T-44.

The new project "Object 136" was undertaken by Morozov's design bureau. Later, this tank did receive the T-44 designation. Besides torsion bar suspension and perpendicular engine layout there were some other technical inventions applied.



The prototype of the T-44 and the captured Panther after the comparative trials.

Had these features been applied on several different vehicles separately, they had not been so effective. The revolutionary design of the T-44 has defined the whole Soviet tank development for the next several decades.

The height of the engine compartment was lowered by relocating the air-filter. By the way, the V-44 engine was equipped

with an improved fuel system thus it's power was increased from 500 to 520 h.p.



The T-44-85. This is the second prototype of the T-44 during trials at Kubinka in the summer 1944.

Besides this, the tank had an improved cooling system, a new 5-speed gearbox and side clutches taken from the T-34. It had a new turret fitted with the ZIS-S-53 gun. The turret was relocated from the front to the center of vehicle, making shooting more accurate. The frontal armor was increased to 120 mm.



The production T-44A armed with the 85 mm Tank Gun S-53 on governmental trials. Summer 1944. (M.Svirin)

To increase the strength of the hull's frontal armor (glacis), the driver's hatch was relocated from the frontal plate to the roof and the bow machine-gun was completely removed. The T-44-85 prototype had a distance between the first and the second road wheel, on production T-44's between the second and the third road wheel. In 1944, the tank successfully passed all trials and was accepted for service.



Another view of the T-44-85. The trials at Kubinka. Summer 1944.

The T-44 was mass produced by the factory #75 in Kharkov. From the end of 1944 through 1945, 965 tanks were manufactured. The T-44 didn't take part in any battle of the Second World War because the Red Army was not ready to accept a new tank; In case of lack of sufficient supplies, inexperienced tankcrews and technical specialists, who could repair and maintain the new tanks.



The T-44-85. The third prototype of the T-44 during trials at Kubinka. On this vehicle, the

The end of the war was close, our army was successfully advancing, so the Soviet High Command delayed introduction of the T-44; but known, that three tanks were added to the "Special Tank Company #100" and tested on the Eastern Front.

driver's hatch was moved entirely to the top of the hull roof. Summer 1944.



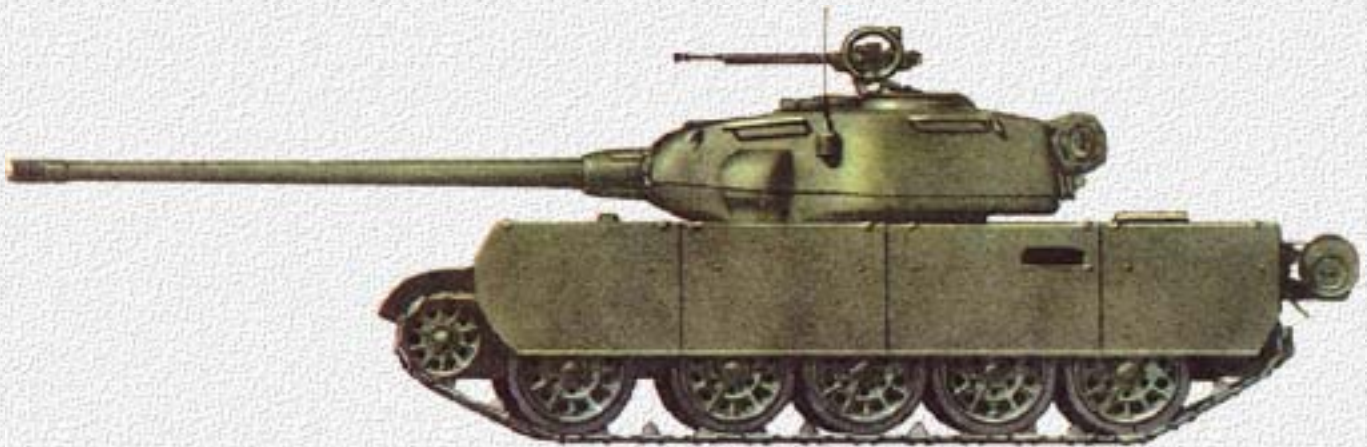
The prototype of the T-44.

The production tank was preceded by several prototypes: the T-44-85 armed with the 85 mm D-5T gun (build before the ZIS-S-53 was accepted) and the T-44-122 armed with the 122 mm D-25T gun. After the tests it became clear that 122 mm guns were not for medium tanks, rather for heavy ones.

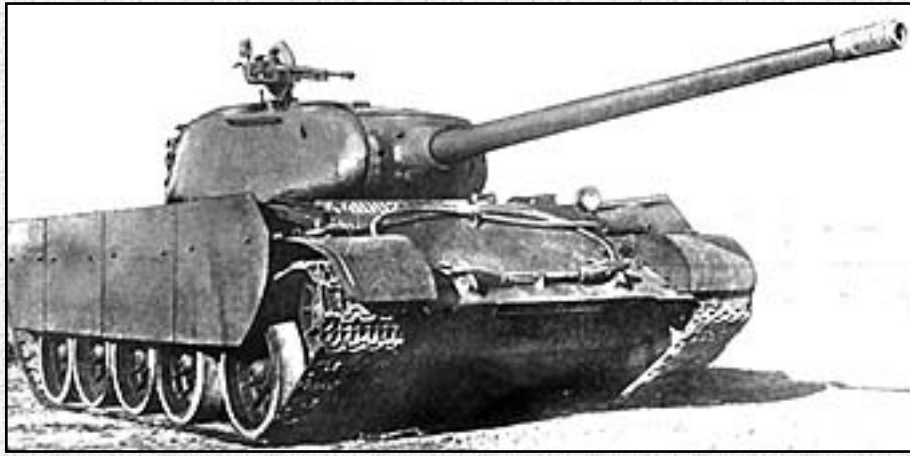


The prototype of the T-44.

In 1945, a new turret was developed to accept a 100 mm D-10T gun or an LB-1 (abbreviation "LB" means Lavrenty Beria). Over the loader's hatch a 12.7 mm DShK AAMG was installed. The sides and chassis of the T-44 were protected with 6 mm anti-HEAT skirts.



The T-44-100 experimental tank



The T-44-100

In 1946, after the introduction of the T-54, which was the "direct descendant", the further development of the T-44 was canceled, though it remained in service. It was in mass production until 1947. In 1961 the main parts of the T-44 (engine, transmission, chassis, etc.) were unified with the T-54, and in 1966 the T-44 was equipped with a gun stabilizer.

The modernised T-44M and T-44S served in the Soviet Army up to the end of 1970's. There were many vehicles which were based on the T-44M: artillery and tank tractors, engineer tanks, etc.



The T-44 in the Tiger's "skin".

Also, it went down in history of Soviet tank development as the predecessor of a large family of T-54/55 and T-62 main battle tanks as well as... movie actor! It played a T-34's role in the movie "Soldier's father" and played even a Tiger's role in the movie "Act by situation".

The T-44-122 Experimental Tank



The T-44-122 armed with the 122 mm D-25-44T and the second prototype T-44 armed with the 85 mm D-5T. Comparative trials.
(M.Svirin)

The gun was returned to the factory #9 for repair and improvement of the revealed drawback.



The T-44-122 on trials. Notice the cartridge loading shot on the vehicle. (M.Svirin)
cancelled.

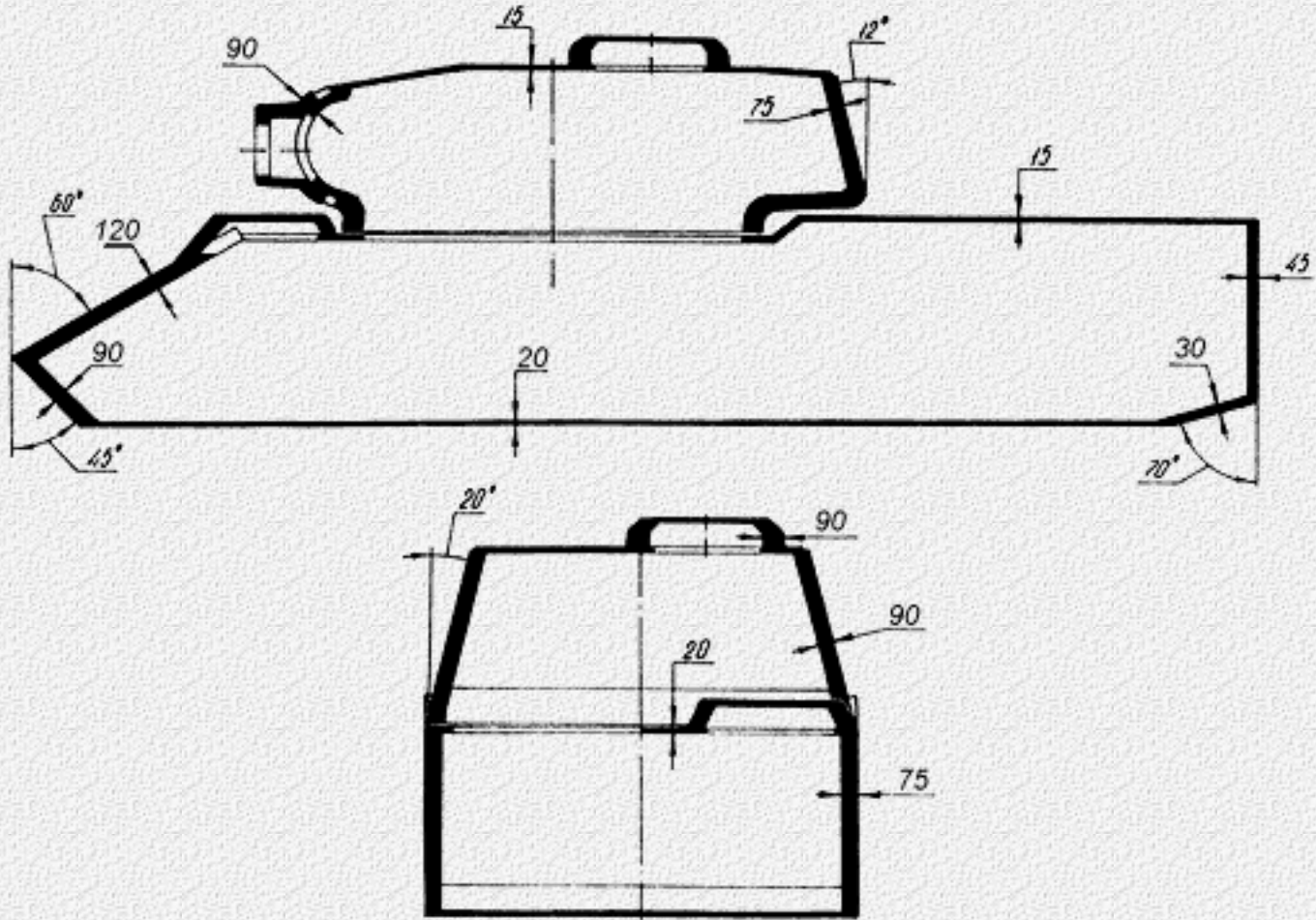
The third prototype T-44-2 was armed with the 122 mm Tank Gun D-25-44T. This gun was very similar to its basic model D-25 but distinguished itself with some minor details.

The only new feature that was included was: the gun used cartridge loading shots instead of separate loading. Expecting that cartridge loading would increase the rate of fire. The first trials were in February-March 1944 but were unsuccessful due to gun failure.

In April-May 1944 the trials were resumed, however the practical ROF didn't increase and still remained 2-3 shots per minute. The tank's turret was too cramped to operate with such long and heavy ammunition and besides the T-44-2 had limited ammunition stowage - only 24 rounds, being insufficient for a medium tank. After it was realized, trials were stopped all further work was

Parameter	Value
Crew, men	4
Weight, kg	31 800
Length, m	7.65
Width, m	3.18
Height, m	2.41

Armament	1 x 85 mm ZIS-S-53, 2 x 7.62 mm DTM TMG
Ammo	85 mm: 58 shells 7.62 mm: 1890 rounds
Engine	V-44, 12-cylinder diesel, 520 h.p.
Range, km	300
Max. speed, km/h	51



REFERENCES:

[Memoirs of the T-44 tester](#)

[Specification of Soviet tanks](#)

[Specifications of Soviet tank guns](#)

Sources:

S.Gryankin "The T-44", a historical issue of the "Tankomaster"
"Soviet tanks in combat 1941-1945. The T-28, T-34, T-34-85 and T-44", Concord publications company
S.Zaloga, J.Grandsen "T-34 in action"
M.Baryatinsky "Soviet tanks of the World War Two", 1995
Cover picture - M.Petrovsky

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The FAI Light Armored Car

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The FAI-M armored car. The last alive vehicle.

Note: All Russian terms and abbreviations shown as *red italic* are described in the [Glossary](#).

Manufacturing of the FAI, one of the most mass-produced armored cars in Soviet history, began with a contract between the Soviet Government and Henry Ford's corporation. On May 31, 1929, according to that contract, Ford was to supply the plans for the "Ford-A", "Ford-AA" and "Ford-Timken" trucks.

In February 1930, truck assembly began at the "Gudok Oktyabrya" factory in Nizhnij Novgorod. In November 1930, the "KIM" factory (Moscow) commenced truck production as well. From April 1932, manufacturing of the "Ford-AA" trucks also began at a new factory located in Nizhnij Novgorod. This factory was built by the Ford corporation under contract. Here, from December 6, 1932, the manufacturing of the "Ford-A" truck had begun.



The FAIs on the military parade in Moscow.

Later, Nizhnij Novgorod was renamed to Gorkiy, and its factory was renamed to "GAZ imeni Molotova" (Molotov's GAZ). The specifications for all vehicles were re-calculated from the British (inch) to the metric system. After that all vehicles received new names:

"Ford-A" - "GAZ-A"

"Ford-AA" - "GAZ-AA"

"Ford-AAA" - "GAZ-AAA"

Soon after the contract with Ford was signed, the Russians made several attempts to develop a light

armored car on the "Ford-A" chassis (this confirmed by the order of **UMMA RKKA**). The design bureau (Chief engineer N.I.Dyrenkov) developed two armored cars: the D-8 and the D-12.

In 1931, both vehicles were accepted for service, although they didn't satisfy all the Red Army's demands. This was mostly because the design's non-traversing machine-gun installations left the sides and rear unprotected. As a result, designers were ordered to develop a new hull with a new turret with 360° traversing.

In 1931-1932, by the order of **UMMA RKKA**, the design bureau of the Izhorskiy Factory developed a new vehicle. The new armored car was named "Ford-A Izhorskiy" or simply FAI. Mass production of the FAI started in 1933.

The main armament of the FAI was a single DT machine-gun, mounted in a revolving turret. The turret could be rotated manually, but in addition the MG's spherical mount allowed a $\pm 10^\circ$ horizontal angle of fire without traversing the turret. In 1935, some vehicles received special steel tyres instead of the conventional rubber tyres. These steel tyres allowed the FAI variant to run on railroad tracks with an 86 km/h top speed.

Such vehicles (some sources name them FAI-J) were used as armored rail scout cars in connection with armored trains. However, they could only reverse at 24 km/h - which made them too slow to be completely practical as rail vehicles.

In 1935, at the Izhorskiy Factory a new armored car was developed, based on the chassis of the M-1 automobile. This new vehicle had more room for the crew, some of whom would be equipped with radio.



A destroyed FAI. Spain 1936.

With the advancements allowed by the M-1 chassis, mass production was shifted from the FAI to the new armored car--named the BA-20. However, after the production change, about 300 FAI's hulls still remained in factory warehouses. So, the Soviet engineers came up with an idea to mount these hulls on the M-1 chassis. This "hybrid" was classified as the FAI-M.

Prior the Great Patriotic War, FAIs were the most widespread armored cars in the Red Army. They took part in all military conflicts from 1930 to 1943. Moreover, they served in Spain during the Civil War, where both sides used those vehicles widely.

Until recently, most people believed that only one FAI hull remained, the damaged example now housed in the Warsaw (Poland) military museum. However, another FAI-M in running condition appeared at the "Exotic vehicles-98" exhibition on July 10-12, 1998, at Tushino, Moscow. It [was displayed](#) by the "Club of the Military History of **RKKA**". The remains of this vehicle were found and recovered from a swamp near Novgorod.

Parameter	FAI	FAI-M
Crew, men	2	2
Armor, mm	6-4	6-4
Armament	1 x 7.62 mm TD TMG	1 x 7.62 mm TD TMG
Ammo	1323 rounds	1323 rounds
Engine	"GAZ-A" 4-cylinder petrol, 42 h.p.	"GAZ-M1" 4-cylinder petrol, 50 h.p.
Fuel, litres	40	60
Range, km	200	315
Max. speed, km/h	80	90

Sources:

"The armored cars", NIIBT Poligon GBTU KA, Kubinka, 1944

"World War II", Quadrillion Publishing Ltd.

"Tankomaster", #2, 1996

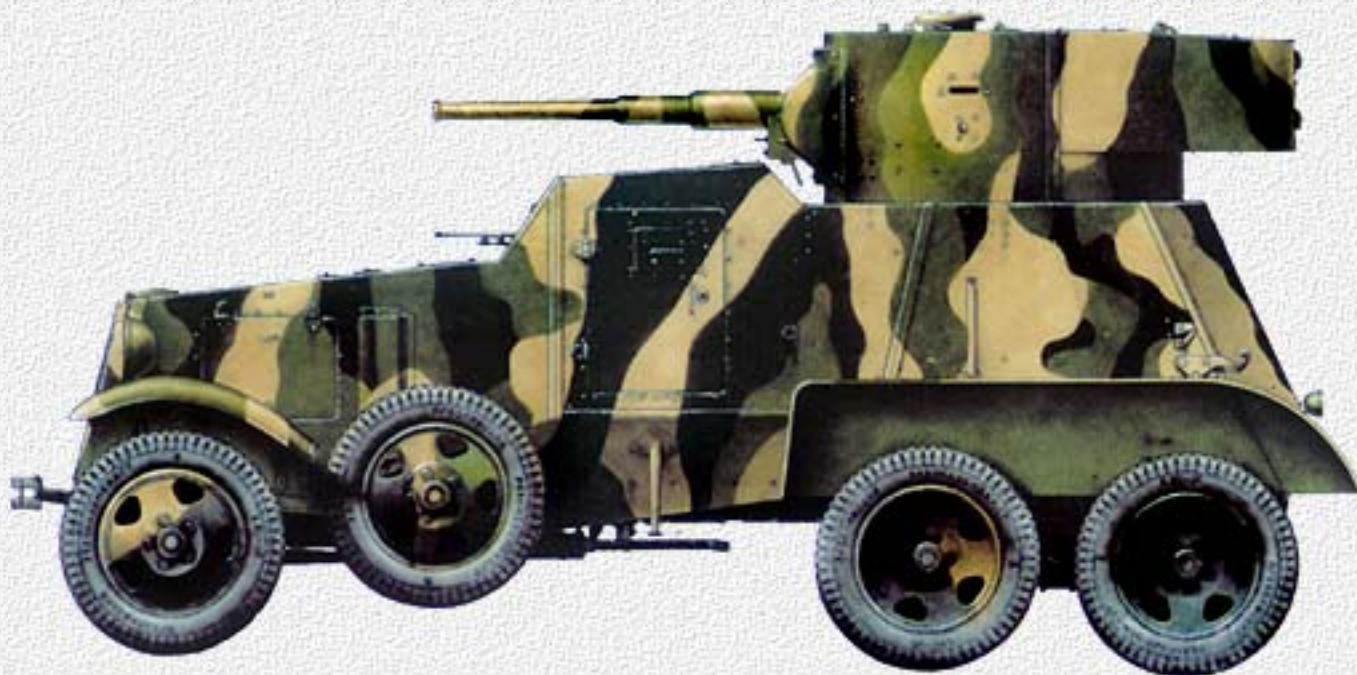
"Bronekolleksiya", #1, 1998

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The BA-3, BA-6, and the BA-9 Armored Car

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The BA-6 of the Independent Reconnaissance Battalion of the 1st Tank Division of the 1st Mechanized Corps. North-Western Front. Krasnogvardeisk area. August 1941.

Note: All Russian terms and abbreviations shown as *red italic* are described in the [Glossary](#).

The BA-1

The development of a three-axle armor cars in the USSR began in the early '30s. The design efforts were mainly based around the chassis of American Ford Timken trucks, which were first delivered to the Soviet Union in 1931. Production of this automobile began at the end of the year at the "Gudok Oktyabrya" factory in Kanavin, adjacent to Nizhnij Novgorod. In the fall of the same year an armored body was applied to the chassis at the Moscow Rembase #2 (Rembase means Repair Station). Approximately 20 of these armored cars were built under the designation BA-27M. Several dozen D-13 armored cars, designed by N.I.Dyrenkov and based on the same chassis were built concurrently at the Izhorskij Factory.



The BA-I and the D-8 (at the rear) on the military parade in Moscow. November 7, 1934. (RGAKFD)

In 1932, engineer P.N.Syachentov, known for his work in the field of artillery, drafted up a general-purpose amphibious armored car BAD-2 (designation acronym stands for "armored car-rail trolley"), which could travel on railroad tracks. Only one BAD-2 was built. However, not a single one of the mentioned machines possessed satisfactory technical specification desired by the military. The army needed a medium gun-equipped modifiable armored car.

In 1932, the "BA-I" armored car was designed at the Izhorskij factory under the direction of A.D.Kuz'min. The "I" in the designation stands for Izhorskij; in some publications the designation is written as simply "BAI". During its creation designers employed the same Ford-Timken chassis. The complete hull of the vehicle was welded together - an engineering feat by the standards of that time. Doors for the crew were located on the sides and rear of the hull.



BA-Is (on the front) and FAIs armored cars.

The cylindrical welded turret contained a standard 37-mm tank gun (supplied with 34 rounds) and a separately-mounted ball mount DT machine-gun. A second DT machine-gun was located in the frontal hull plate to the right of the driver. Due to the step-like form of the roof (the under-turret plate was significantly lower than the roof of the driver's compartment) the overall height of the vehicle was decreased.

Another innovation in the BA-I's construction were freely rotating spare wheels (an idea borrowed from the D-13) suspended at the sides of the hull. The spares prevented the car from bottoming out and assisted in the traversal of trenches and ditches. Later on, this design element was transferred from one BA to another, all the way to the BA-10.

The BA-I armored car was built in small numbers in 1932-1934 and served in the Red Army.

The BA-3

In 1934 the Izhorskij factory produced an improved model - the BA-3. The hull of the BA-I underwent only insignificant changes: the rear section of the hull was extended by 50mm, the engine compartment acquired air-escape windows, the running board was shortened, and the rear fenders now accommodated fastenings for all-terrain tracked chains. Installation of the body onto the Ford Timken chassis was accomplished with the help of 10 brackets, which were bolted to the side members through rubber gaskets.



The BA-3 armored car. (M.Baryatinsky)

The main innovation in the new vehicle was the turret and its armament. The BA-3 received the turret from the T-26 tank, which had thinner 8 mm armor* with a paired weapons mount - the 45 mm 20K gun model 1932/38 (supplied with 60 rounds) and the DT machine-gun. The ammunition was located partially in the turret and partially in the hull of the armored car. In the recess of the turret there were two honeycomb racks with space for 40 shells, along the hull wall there were housings for 12 more (6 per side) and for 8 more along the walls in the fighting compartment (4 per side).

* according to the "ARMORED CARS" album of the NIIBT Polygon GBTU KA of 1944 - the turret armor is 8 mm, according to "THE BA-3 ARMORED CAR; Operational manual" of NIIBT Polygon GBTU KA issued in October 1934, - it is 9 mm.

The four racks in the turret and the hull accommodated 53 magazines for machine-guns. For the first time in Soviet armored car industry, in an attempt to improve mobility, the

rear wheels of the BA-3 were outfitted with all-terrain tracks, known under the foreign name "Overall." Each track weighed 71 kg and was comprised of 25 80x35 mm links. The length of one track was 4500 mm, step size - 180 mm. Installation of the tracks by the whole crew took 10-15 min.



The column of BA-3 (on the front) and FAI armored cars. Manoeuvres of the Kiev Special Military District. 1935.

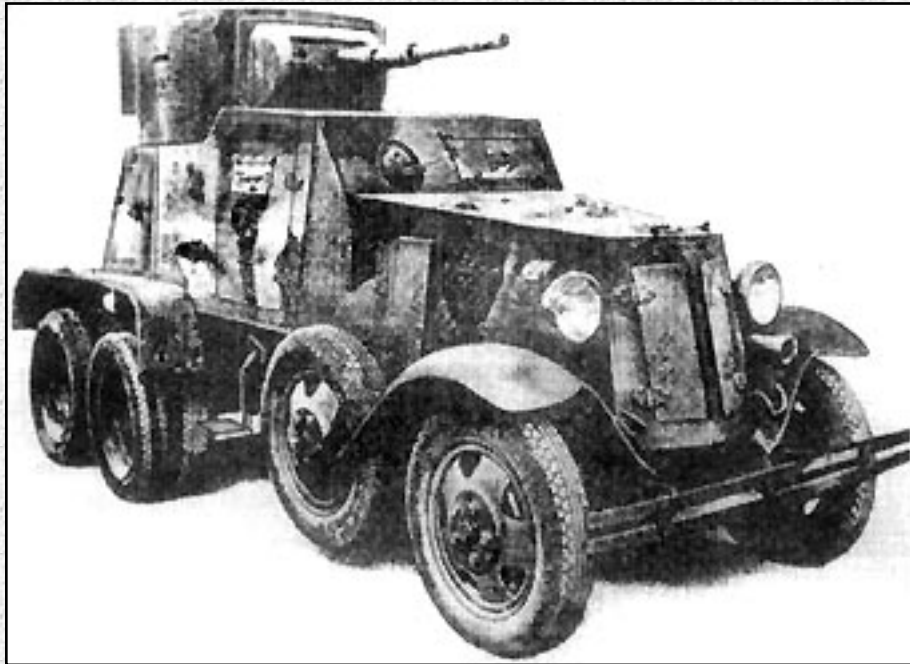
In June 1943, the BA-3 armored car fitted with a non-armored hull underwent testing at the NIIBT proving grounds of the UMM RKKA at Kubinka, not far from Moscow. During testing the 5.82-tonn vehicle achieved a speed of 70 km/h on a paved road (the number seems a bit high, but that's how it was reported), while the speed on a dry dirt road did not exceed 35 km/h. During the runs the engine overheated and it was recommended that the cooling system be improved.

The front suspension had to be strengthened as well. Otherwise, no major problems were revealed, and the only recommendations were for minor revisions of the internal instrumentation layout. As stated in the concluding statement of the review committee: "the armored car displayed good characteristics necessary for a battle-worthy vehicle and can be proposed to be accepted for service to RKKA."

The production of the BA-3 was organized at the Izhorskij and the Vyksunskij factories, which in the years 1934-35 produced 180 (168 according to other sources) armored cars of this type.

The BA-6

By 1935, the GAZ factory mastered the production of the domestic three-axle automobile GAZ-AAA. The Izhorskij factory quickly developed a new BA-6 armored car based on this automobile. The hull, turret, and the location of ammunition, joints and equipment were essentially unchanged from those of its predecessor.



The BA-6 armored car.

The only visual distinction that identified the new car was the absence of a rear door, rear observation windows and a running board in the rear part of the hull. Also, the rear track increased to 1600 mm (for BA-3 it was 1585 mm); the distance between the front axle and the center of the suspension decreased to 3200 mm (vs. 3220 of BA-3); the distance between the rear axles was shorted as well, from 1016 mm (for the BA-3) to 940 mm. The new armored car was the first to use bullet-resistant tires GK (porous inner tube), filled with porous rubber.

Due to stricter weight control the mass of the car decreased to 5.12 tons without compromising any of the technical parameters. Between 1936 and 1938 the Izhorskij factory produced 386 BA-6 armored cars.

The BA-6ZhD



The BA-6ZhD armored trolley.

Another version of the vehicle - BA-6ZhD ("ZhD" stands for "railroad-going") was produced in limited numbers. When changing from regular to railroad drive setup, special railroad wheels were installed right over common (pneumatic) tyres. However, the outer wheels still had to be removed from the rear axles to match the width of the railroad tracks.

The steering wheel in this case was locked in the center position. At 5,9 tons the BA-6ZhD could reach 55 km/h on rails.

The BA-6M and the BA-9



The BA-6M armored car. *(M.Baryatinsky)*

In 1936, an experimental BA-6M version of the armored car was constructed, which had a truncated cone turret, thicker 10mm armor, a 71-TK-1 radio station and a 50-horsepower GAZ-M engine. The BA-6M weighed in at 4800 kg.



The BA-9 armored car. *(M.Baryatinsky)*

A lighter version of the BA-6M, the BA-9, was built concurrently with the standard model. The BA-9 was armed with a 12.7-mm DK machine-gun instead of a larger gun. In accordance with instructions issued by the people's commissar K.E.Voroshilov in 1937 the Izhorskij factory had to manufacture 100 BA-9's for the army's cavalry units. However, this task could not be accomplished due to the shortage of DK machine-guns.

Armored cars in action

BA-3 and BA-6 armored cars were supplied to arm reconnaissance troops of tank, cavalry and infantry units of the Red Army. In 1937, a motorised armored regiment was formed in the Transbaikalian Military District, which, shortly afterwards, was expanded into a

brigade.



The BA-6 armored car.

It included a battalion of medium armored cars, a reconnaissance battalion (medium and light armored cars) and an infantry machine gunners' battalion. In total there were 80 medium and 30 light armored cars in the brigade. Three such brigades - 7th, 8th, and 9th participated in fighting with the Japanese army at the Khalhin-Gol River.

Virtually at the same time as the armored cars were being supplied to the Red Army, they were also exported to other countries. Foreign sources tell us about the sale of 60 BA-6 armored cars to Turkey.



The radio-equipped BA-6 armored car on the military parade in Moscow. November 7, 1937. (RGAKFD)

However, if the date of the sale is correct, then the vehicles were most likely BA-3's, since the production of the BA-6 did not begin until one year later. This assumption seems valid from an operational point of view as well. It would be easier for the Turks to perform service on the American Ford Timken chassis rather than on the Soviet GAZ-AAA. However, this is my guessing only...



**Crews of the BA-6 receiving combat orders.
Western Front. May 1, 1942. (M.Baryatinsky)**

Starting in December 1936 and lasting up until the withdrawal of Soviet military assistance in 1938 Spain took delivery of 7 BA-1's and 80 BA-6's. One of the first units of the Republican army that received the machines was the 1st Armored Brigade under the command of D.G.Pavlov. This brigade took part in the heavy battles near Madrid in 1937. The crews of the tanks and armored cars were made up of Soviet and Spanish soldiers. During fighting near Madrid, the BA-6's took out several enemy tanks.



**The BA-6 and the BA-20 armored cars.
August 1942.**

By the summer of 1937, an armored car brigade was formed in the Spanish Republican army. In December 1937 up to 30 BA-6's with Spanish crews participated in an advance on the Teruels prominence - the last major and successful Republican operation. After the end of the Civil War, several BA-6's remained in the Spanish army until the early '50s.

BA-6's also served in the Mongolian Revolutionary People's Army. The 6th and 8th armored battalions of the Mongolian cavalry divisions equipped with these vehicles took part in an armed conflict at the Khalhin-Gol River during the spring and summer of 1939.



The BA-6. Autumn 1945.

The foreign press cites instances of BA-6 deliveries to Afghanistan and China. It is hard to verify this information with respect to Afghanistan. As to China, such deliveries seem unlikely, because in the information released by the Soviet press concerning the delivery of military equipment and armaments to China between 1936 and 1939, the BA-6 armored cars (or any other armored cars) are not mentioned.

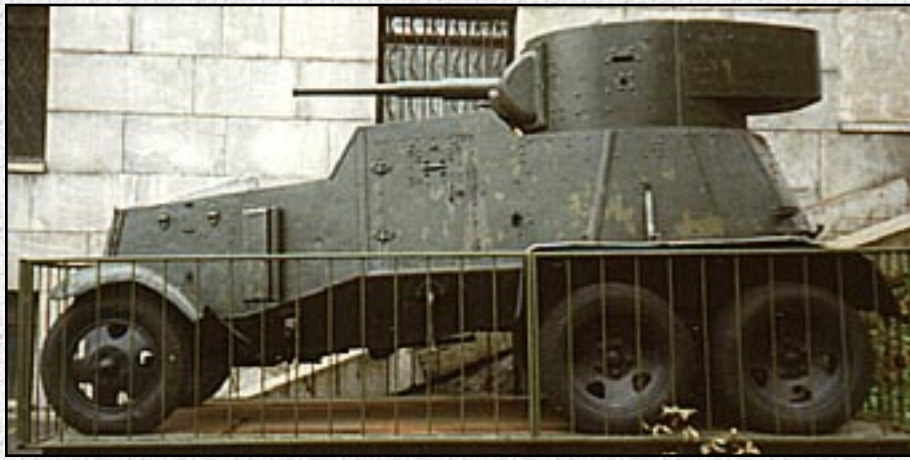


The crew of 2nd sergeant P.M.Andreev is preparing their BA-6ZhD to ride on the railway. Volkhov Front. August 1942. (RGAKFD)

Thus, 150 BA-I, BA-3, and BA-6 armored cars were exported between 1935 and 1939. Most of the others performed service in the Red Army, primarily on the Far East. Nevertheless, a few BA-3's and BA-6's took part in a Polish campaign (1939), during the Winter War, as well as in the Great Patriotic War (they could be found in the military forces at least as late as the middle of 1942).

The Finish army, which captured some of these vehicles in 1939 and 1941, exploited them much longer. As of June 1, 1944, the Finns had possession of one BA-3 (which served until the end of 1944) and 10 BA-6's (which were in operation until the end of 1956.) Currently an example of a BA-3 armored car (#5633) is kept in the tank museum in Kubinka; and a BA-6 (#4382) can be seen on display at the Central Museum of Armed Forces (CMVS) in Moscow.

In conclusion it should be noted that at the time of creation and even in the first stages of WW2, these armored cars were the most heavily armed in the world. Their British and American counterparts acquired 37-40 mm guns only in 1942. The first adequately armed German armored car became the widely known "Puma" (1944).



The BA-6 at the CMVS. (photo by E.Boldyrev)

Unfortunately, massive armament was perhaps the only and most important merit of the medium Soviet armored cars of the '30s. Battle experience revealed the practical impossibility of their deployment on the front lines due to poor off-road capability.

The list of major shortcomings included weak armor and a lack of a driving controls post in the rear.

The most advanced representative of the large series of Soviet gunned armored cars - the BA-10, also exhibited these shortcomings. Incidentally, all foreign armored cars of those years built on the chassis of commercial vehicles suffered from the same "illnesses." With the arrival of all-wheel drive wheeled armored cars they became completely obsolete.

REFERENCES:

Blueprints of the BA-6: [sheet 1](#) and [sheet 2](#)
[Specifications of Soviet tank guns](#)

Translated by:
[Leonid Sapronov](#)

Sources:
"Armored Cars" NIIBT Polygon GBTU KA 1944;
"The BA-3 armored car. Operational manual" NIIBT Polygon GBTU KA 1934;
"M-Hobby" #3, 1999;
"Light tank and armored cars 1931-1939", part 2, "Eastern Front", 1996;
"Fighting equipment and Weapons" #3,4 1998.

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The BA-64 Armored Car

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The BA-64B of the Northern Army Group. October 1954. *(S.Svinkov)*

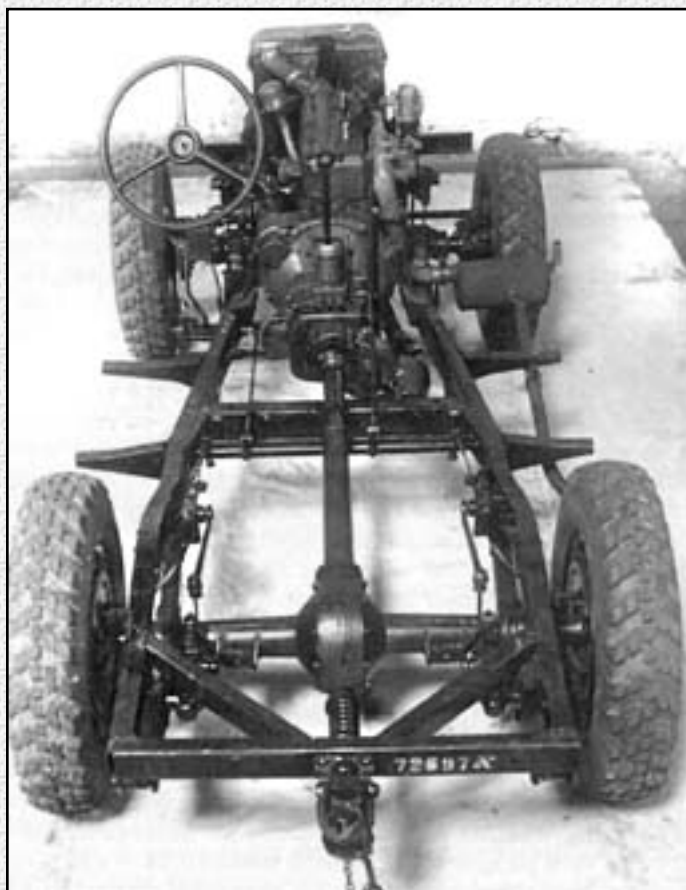
Note: All Russian terms and abbreviations shown as *red italic* are described in the [Glossary](#).

The BA-64



Chassis of the GAZ-64.

Before the Great Patriotic War, the **GAZ** factory was the main supplier of driving gear for light armored cars like FAI, FAI-M, BA-20 and their variations. All those vehicles had two common disadvantages: their flotation ability was far from perfect and their armor protection was too weak.



Chassis of the GAZ-64.

When the Great Patriotic War did start, the **GAZ** was in full swing of developing and manufacturing GAZ-64 light jeeps (Chief-engineer V.A.Grachev), designed upon military demands. Using their large experience, engineers of the GAZ's design bureau decided to develop a light armored car on the chassis of the GAZ-64. The new project received the "Izdelie 64-125" designation.

On July 17, 1941 work on the new project started. The whole composition of further vehicles was designed by engineer F.A.Lependin, the Chief-engineer was G.M.Vasserman.

The new vehicle highly distinguished itself from all off its predecessors. It was designed using the experience of modern war and latest demands of the Red Army. It supposed to be used as a reconnaissance and commander's

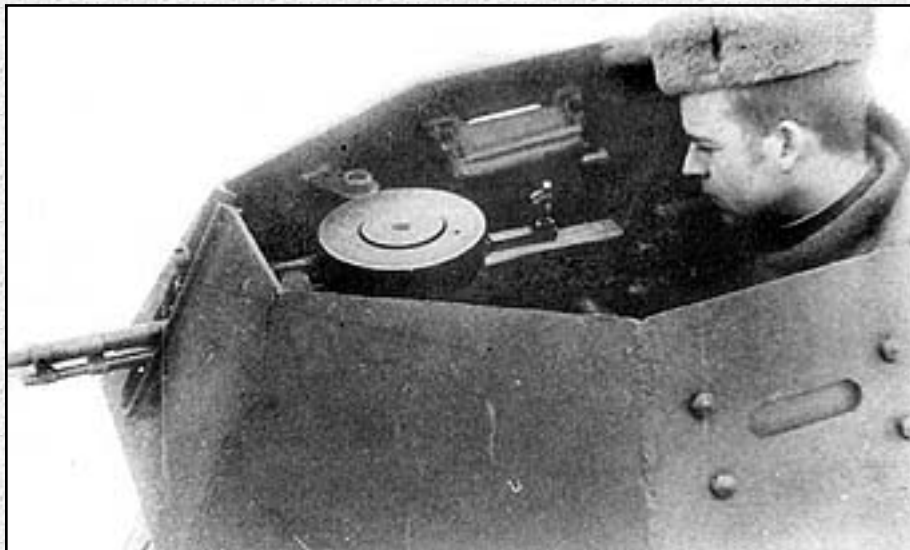
vehicle, to fight against enemy paratroops, for motorcade's protection and for anti-aircraft protection of tank columns.

The German Sd Kfz 221 had a certain influence on the design of the vehicle as well. By September 7, 1941, a Sd Kfz 221 was delivered to the **GAZ** factory.



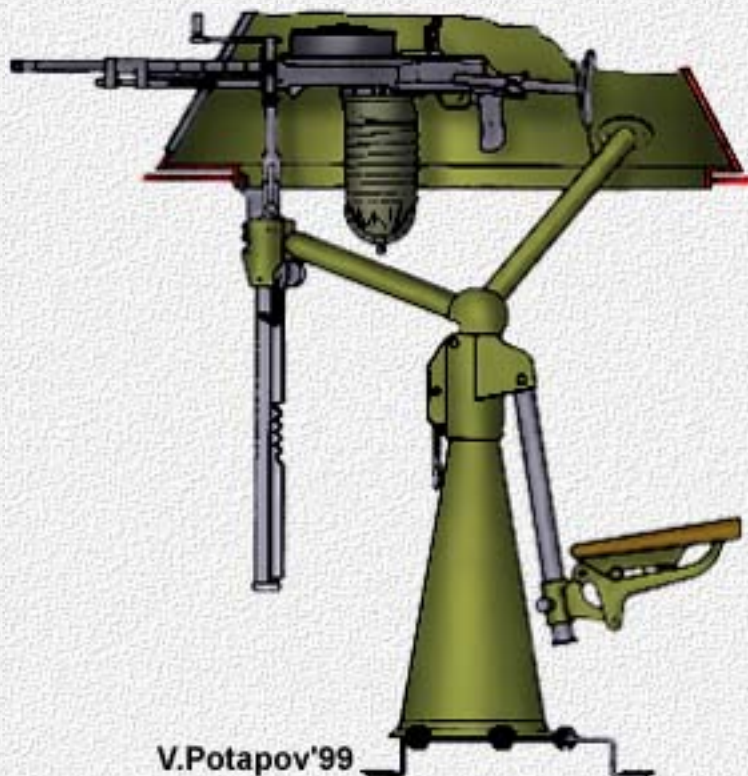
"Izdelie 64-125". January 1942.

Despite lack of experience in developing armored hulls, Soviet engineers U.N.Sorochkin, B.T.Komarevsky, V.F.Samoilov and others could finish their work with big success. The armored plates of different thickness were fitted with rational angles which increased the overall protection of the armored car. Which gave the major superiority over the all previous Soviet armored cars and some of the German armored cars in the same class as well. This is especially true if we'll take the small weight into account.



The DT machine-gun installation. Note the vision unit and antenna mount on the opposite side of the turret.

However, having little weight and good armor protection, the new car had a very limited internal space. The crew consisted of two men: the driver's station was set up on the centerline of the car, the commander's station was behind the driver. Some other changes compared to the original GAZ-64 were made: the cooling system, ventilator and electric system were altered. The rear suspension bracket was strengthened also, but the most important improvement was made in the engine: now it could work on low-grade fuel and oil, which was of high importance for the army.



The DT machine-gun mount. (V.Potapov)

by Vyksunskiy Factory, then manufacture was organized on **GAZ**. By May 1942, the first three armored cars were manufactured and sent to Governmental trials, which they passed successfully. In June 1942, the first party of new armored cars were sent to the Eastern front.

Work on "Object 64-125" did run quickly. By the end of November 1941 the hull was completed, by January 9, 1942 the first prototype of the new armored car was finished. On February 17, 1942 it was named "BA-64", where the "BA" means "broneavtomobil" (armored car). Because it's turret wasn't completed yet, the 7.62 mm DT machine-gun was mounted on the open machine-gun ring. Next day (Jan 10, 1942) the vehicle was showed to K.E.Voroshilov.

On March 9, 1942, after successful trials, designers were ordered to improve some shortcomings. On March 14, 1942, the BA-64 armored car was accepted for service.

First, all armored hulls were manufactured



The early variant of the BA-64.

The BA-64 was the first Soviet armored car with four-wheel drive, and it could climb 30° slopes, cross 0.9 m ford and 18° slippery hill-sides. The vehicle could move on sand very well. The survivability of the BA-64 was increased by using bullet-proof tyres.



The later variant of the BA-64.

The driver's observation visor was made of removable bullet-proof glass (also known as triplex). The same glass was used for the turret's embrasures. The 7.62 mm Degtyarev's machine-gun was mounted on a universal machine-gun ring, which allowed a 360° rotation. Some of BA-64's (41.5%) were equipped with wireless RB-64 or 12-RP.



The BA-64. The 36th Brigade of the 4th Mechanized Corps of the 3rd Ukrainian Front. Near the Razdelnaya railstation. 1944. (S.Svinkov)

The BA-64B



The BA-64B on the trials. Note the new tools position.

After the beginning of the BA-64's mass production, constructors started with the modernisation of this armored car. The main disadvantage was discovered - poor side steadiness (stability). Which was because of the narrow track (the space between wheels). So the track was increased to 1446 mm and two shock-absorbers were added to the front suspension. Beside this, some other minor improvements were made. At the end of October 1942 the "wide-track" BA-64 (or BA-64B) successfully passed all trials and was accepted for service. The

improved wide-track chassis allowed to list on 25°.

From the spring of 1943 up to 1946 mass production of the modernised BA-64B continued. In 1944, by a report of NKO, the monthly output of the BA-64B was 250 cars, yearly output of the radio-equipped BA-64Bs was 1404. Notwithstanding their weak armament, BA-64 armored cars were used successfully in most reconnaissance operations as well as for infantry support.

Most successful was the BA-64 in street fighting, where the ability to fire on upper floors was very important. BA-64's and BA-64B's were used in all major operations and battles of the Eastern Front. A total of 8174 armored cars from both types were accepted for the Red Army, 3390 of which had a wireless. In 1946, the last 62 vehicles were manufactured, bringing a total of 3901 BA-64's and 5209 BA-64B's being manufactured.



BA-64B's on the streets of the liberated Bucharest. 1944.

After the war, BA-64B's served in the Soviet Army as training vehicles until 1953. Other countries of the Warsaw Pact used them much longer. Poland received 81 BA-64's and BA-64B's, Czechoslovakia - 10, DDR (Eastern Germany) used them as police armored cars. Many vehicles were sent to Yugoslavia, China and Northern Korea.

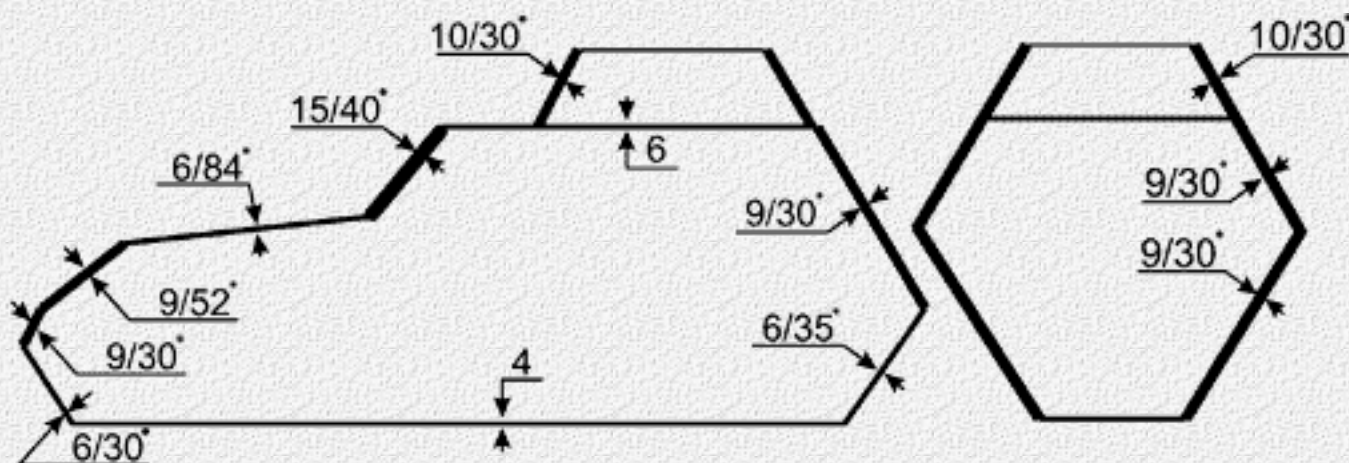


The BA-64B at the Victory Banner parade near Reichstag. May 20, 1945. (S.Svinkov)

Parameter	BA-64	BA-64B
Crew	2	2
Weight, kg	2360	2425

Length m	3.66	3.66
Width, m	1.53	1.69
Height, m	1.9	1.85
Armor, mm	4-15	6-15
Armament	1 x 7.62 mm DT	1 x 7.62 mm DT
Ammo	1260 rounds	1260 rounds
Engine	"GAZ-64" 4-cylinder, 50 hp	"GAZ-64" 4-cylinder, 54 hp
Fuel, liters	90	90
Range, km	540	560
Max speed, km/h	80	80

BA-64 armoring scheme



REFERENCES:

[Modifications of the BA-64 armored car](#)

[Specifications of Soviet tank guns](#)

Sources:

"The BA-64 armored car. Short manual", Moscow, Voenizdat, 1943

"The armored cars", NIIBT Poligon GBTU KA, Kubinka, 1944

"Vezdekhody RKKA", Armada #7

"M-Hobby" #4 1999.

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Modifications of the BA-64

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Note: All Russian terms and abbreviations shown as *red italic* are described in the [Glossary](#).

The BA-64V

Simultaneously the mass production of the BA-64, both factories has continued the improvement of this armored car. To use it as armored trolley and convoy the rail echelons, there were several attempts to put it onto rail tracks.



The BA-64V rail trolley. Winter 1942-1943.

First attempt (in July 1942) was undertaken by the Vyksunskiy Factory. Using the stored quantity of the rail wheels, which have remained from the days of BA-20ZhD's manufacturing (the abbreviation "ZhD" means "Zheleznodorozhniy" or railway), the factory made the rail modification of the BA-64.

It is important to say, that the chassis of the armored car was slightly changed because its track was more narrow than on the BA-

20ZhD, thus it couldn't be installed on the railway without of some corrections. The narrow track was compensated by longer axes, which led to faster deterioration of the roller bearings.

Nevertheless, the BA-64 was modernised and, in December 1942, the modernised BA-64V ("V" means "Vyksunskiy") was sent to the trials. The total weight increased to 2586 kg. The trials revealed some other disadvantages: the reverse speed was only 13 km/h (the reverse of the BA-20ZhD was 27 km/h). That was especially bad because the usage as rail trolley supposed the movement with equal speeds in both directions. Initially, BA-64 was designed as armored car, not as locomotive and, as a result, another two disadvantages were found. First problem was with its gearbox: it wasn't designed for a long reversible work, thus it often broke. The second problem was with cooling of the

engine: it was of air-cooling, and thus, during the backward movement it didn't receive a proper coolness and quickly overheated.

From the other hand, such way of modernisation was the easiest and, without a doubt, the cheapest.

The BA-64G



The BA-64G. Autumn 1942.

Simultaneously with the Vyksunskiy's attempts to develop an armored trolley, the same works were undertaken on the GAZ Factory.

Unlike the BA-64V, the engineers of the GAZ have decided to develop an universal vehicle, which could move both on road wheels and rail wheels. Their variant - BA-64G ("G" means "Gorkovskiy") - represented the common BA-64 that was equipped

with additional (removable) four rail wheels as shown on photos. To drive down from the railway, crew should raise the rail wheels. The backward movement was provided by a special reversible distribution box.

In November 1942, the first BA-64G was manufactured and the very first trials were undertaken. Unfortunately they have failed: during the installation on the railway, both axes of the rail wheels were bent. Subsequent trials revealed the instability during the movement and frequent falls from the rail track. That was because of small diameter of the rail wheels. Because of this, further trials were cancelled until the improvement of all discovered defects won't be done.



The BA-64G. Front view.

From January 12, 1943, the trials continued with improved variant of the BA-64G. In spite of all improvements, the discovered defects still existed. As before, there were frequent falls from the railway and frequent engine's overheat (during the frosty winter!). The experiments with the BA-64G have continued until the summer 1943, when they was cancelled at all. At that moment totally three BA-64G's were manufactured.

The BA-64D



BA-64D armed with the DShK. Spring 1943.

The insufficient firepower of the 7.62 mm Degtyarev's machine-gun revealed from the very first battles. It forced designers to find ways to rearm the BA-64 with a more powerful weapon. At that time, the most perspective way seemed to rearm it with the 12.7 mm DShK heavy machine-gun. That was the very reliable HMG, it received many positive responses from regular army. Moreover, it had a very quality ammunition,

which was already set up in a mass production. The idea was conform and further modification received the "BA-64D" designation (the "D" means "DShK").

For the very first time (September 23, 1942) designers tried just to replace the DT TMG with the DShK HMG, without any major changes. They have "modernised" the narrow-track BA-64. Next day, they had showed the vehicle to N.A.Astrov, who was pleased with the "new" vehicle and offered some valuable ideas.

Nevertheless, the "simple" rearming the BA-64 with such a powerful weapon was

impossible and has supposed to add a definite improvements in construction in both BA-64 and DShK. The turret's support should been strengthened due to the big weight of the DShK (34 kg) and its big recoil force. Besides, the special K-8T sight was added for antiaircraft shooting. For a ground targets there was a standard TMFP telescopic sight.

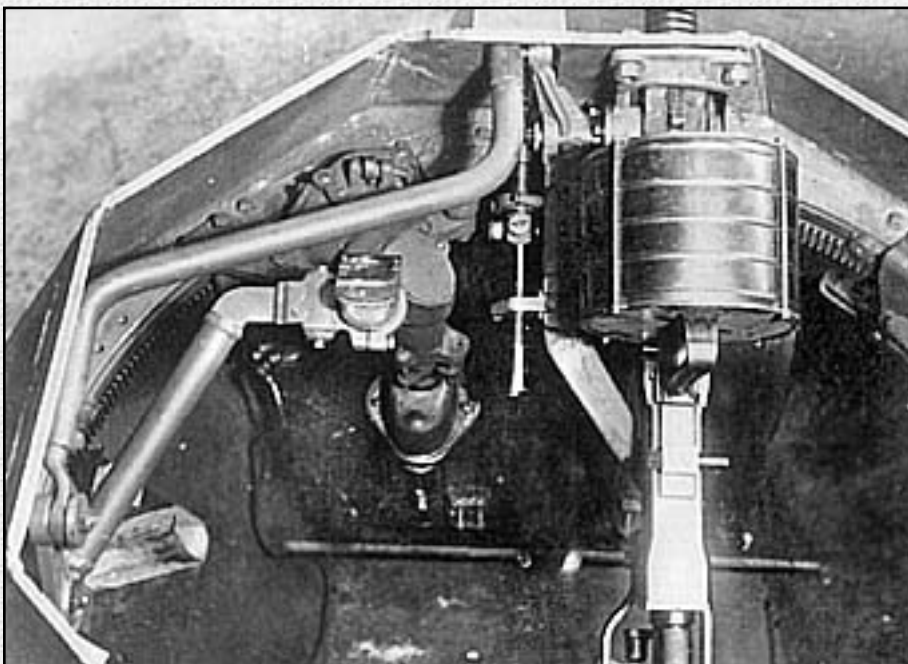


The side view of the BA-64D reveals the guards for protection of the widened turret.

turret and armed by the DShK was manufactured by the March 20, 1943. From April 4, 1943, the trials of that armored car begun on the Striginsky proving ground. The full weight of the BA-64D was 2425 kg.

All these improvements were so serious that the cost price of the turret has raised dramatically. The turret's traversing mechanism contained some elements from the same mechanism of the T-60 light tank. The main difference was that the turret of the BA-64D could be traversed both manually and mechanically. Among the other changes, the thickness of the armor of the turret was increased up to 12 mm, which was important for the safe installation of the DShK.

The first BA-64D with the new turret and armed by the DShK was manufactured by the March 20, 1943. From April 4, 1943, the trials of that armored car begun on the Striginsky proving ground. The full weight of the BA-64D was 2425 kg.



The DShK machine-gun installation with

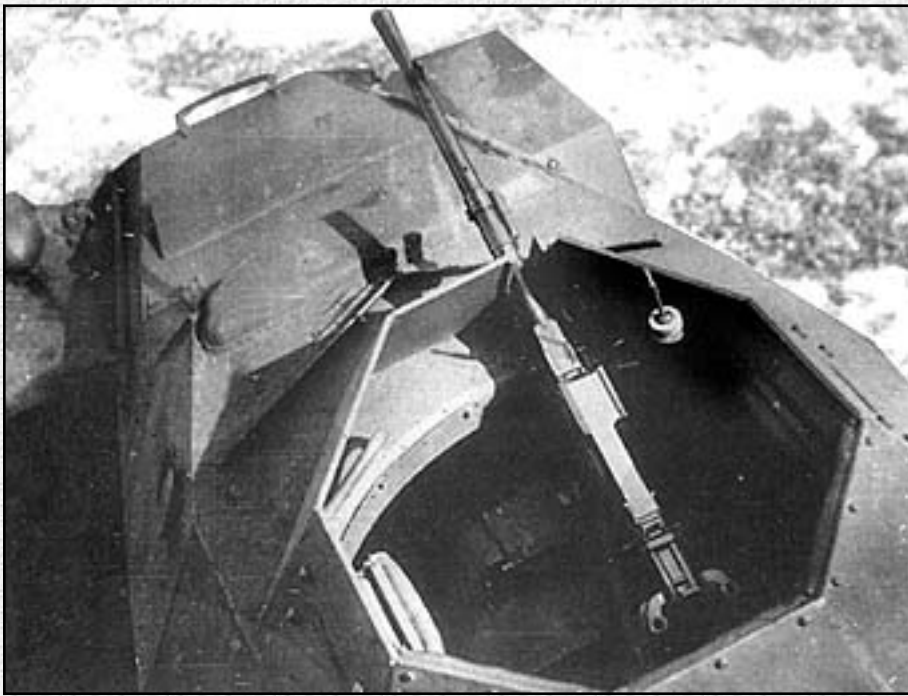
On April 6, the BA-64D was showed to General A.I.Lebedev and General I.P.Telegin. That show was failed due to defects of the modernised DShK. During the shooting, the rounds are jamming because of new magazine, the used cartridges are jamming too. Moreover, that magazine was too small - 30 rounds only! Because of big recoil of the DShK and a narrow track of the BA-64, the machine-gun accuracy was far from perfection if the HMG was

cylindrical magazine. The left rods were need to install the antiaircraft sight.

perpendicular towards the axis of the vehicle.

Nevertheless, on April 12, 1943, the BA-64D was sent in Moscow for showing to the High Command of the Tank Forces of the Red Army. The HQ also noticed all imperfections of the magazine: small capacity, inaccurate design. The HQ recommended to use the steel cartridge belt instead of magazine. However, that was incorrect decision as well because of insufficient space in the turret. So, the GAZ refused that. As a result, the whole project to rearm the BA-64 with a DShK was abandoned.

The BA-64 with the SG-43 machine-gun



The installation of the SG-43.

The appearance of the new, more powerful 7.62 mm machine-gun of the Gorunov's design (SG-43), renewed the idea to rearm the BA-64B. Weighing the 13.8 kg, the SG-43 had the maximum range 2000 metres. It is important to say, by that time all attempts to rearm the BA-64/BA-64B were failed due to different reasons.

From March 3, 1944, the works on rearming of the BA-64B started. There was a single attempt. The SG-43 was installed instead of DT, without any changes in construction of the turret, like the

very first BA-64D. The SG-43 was longer than the DT, but anyway, it was placed in the standard turret. I must say, that the such "simple" installation of the SG-43 reduced the horizontal sector of fire (without traversing the turret).

In April 1944 the BA-64B with the new armament was sent to the proving ground. The trials were unsuccessful. The SG-43 was lack of humeral support which resulted a low accuracy. There were some difficulties of reloading the machine-gun. After the trials, the new armored car was not recommended for service. All further works were cancelled.

The BA-64 with an antitank rifle



**The "home-made" conversion of the BA-64.
The turret removed and PTRD installed
instead. Stalino. November 1943.**

In December 1942, the GAZ had tried to rearm the BA-64 with the 14.5 mm self-loading [Simonov's antitank rifle \(PTRS\)](#). It supposed, that it would increase the firepower of the armored car, so BA-64 would be move valuable in offence and defense.

Because of big recoil force of the PTRS, this AT rile was installed into the turret with the specially designed anti-recoil mechanism (shock-absorber). For the some time, the works on this modification were delayed in favor

of BA-64D, but in March 1943 they were resumed. Judging by **GAZ's** archive documents, there were attempts to modernise the PTRS to increase the current magazine capacity (standard PTRS had five-loading magazine) as well as automate the fire of the rifle (by removing the disconnecter).

However, all those works were abandoned, the reasons are not clear for me yet. Anyway, in the regular army there were sporadic "home-made" conversions with both PTRS and PTRD antitank rifles.

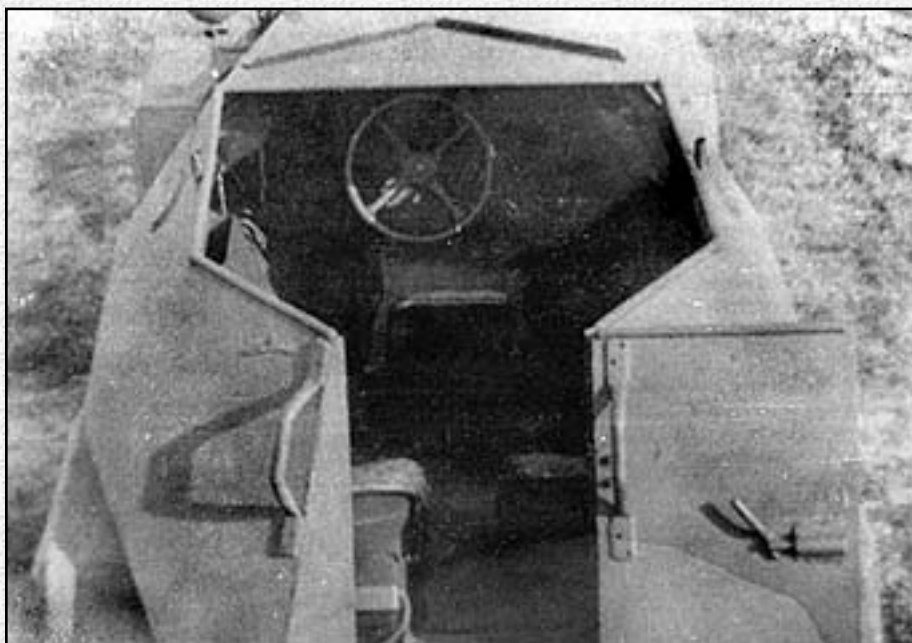
The BA-64E (BASh-64)



The BA-64E armored personal carrier.

door was made, the roof remained only over the driver. The new 55-litres fuel tank was relocated to the left side and put under the bench. New vehicles supposed to be armed with the 7.62 mm Degtyarev's machine-gun.

Further works over the APC have been delayed until the March 1943. At that time the second variant was built. It received the BA-64E designation. The short trials revealed the main disadvantage: it was a quite hard to leave the vehicle.



BA-64E. Rear view.

The success of the German APCs forced the Soviet constructors to develop a transport variant of the BA-64. Frankly, BA-64 was the worst base for the such works however, at that time there weren't any alternatives.

It was supposed that further vehicle will be without a turret and would be open from the top, but the hull will be remained. On October 22, 1942, the first test were made. At the rear hull the

At the mid-March, the third variant of the BA-64E was built. It had better crew (6 men) layout. By the 3rd April, the next, fourth variant was built. It was based on BA-64B. The sides were higher and the pair embrasures were made from the each side. The DT was removed at all, however the question about armament of the BA-64E has discussed for a quite long time and there were attempts to arm the BA-64E with the light 37-mm ChK-M-1 gun.

By the end 1943, **GAZ**

manufactured three BA-64E and sent them to the regular army for a detailed trials. Two vehicles were sent to the 3rd Guards Tank Army, and one BA-64E - to the 7'th Mechanized Corps. Both units returned a negative response: too cramped, too

uncomfortable. Using their response, GAZ produced another three APC's. Now, each APC could carry 4 infantrymen. On September 28, 1943, they have been showed to the Marshal J.N.Fedorenko. He offered to add some changes. **GAZ** agreed and produced another three APC's with a various realization of the Fedorenko's recommendations. After that they have been showed to Fedorenko again.



The army's "home-made". The BA-64 conversion to the staff vehicle.

reason was simple: the war ended faster then the first produced vehicle reached the frontline.

He chose one of them and offered to install the powerful radio 12-RTM. As the result, the new staff vehicle has been created. After the minor improvements that vehicle was showed to a special commission of the Tank Forces of the Red Army. In some literature, that vehicles named BASH-64 ("Sh" means "shtabnaya" - staff), but I've never seen that designation in archive documents.

In spite of positive responses of that commission, that modification was not accepted for service. The

The BA-64Z



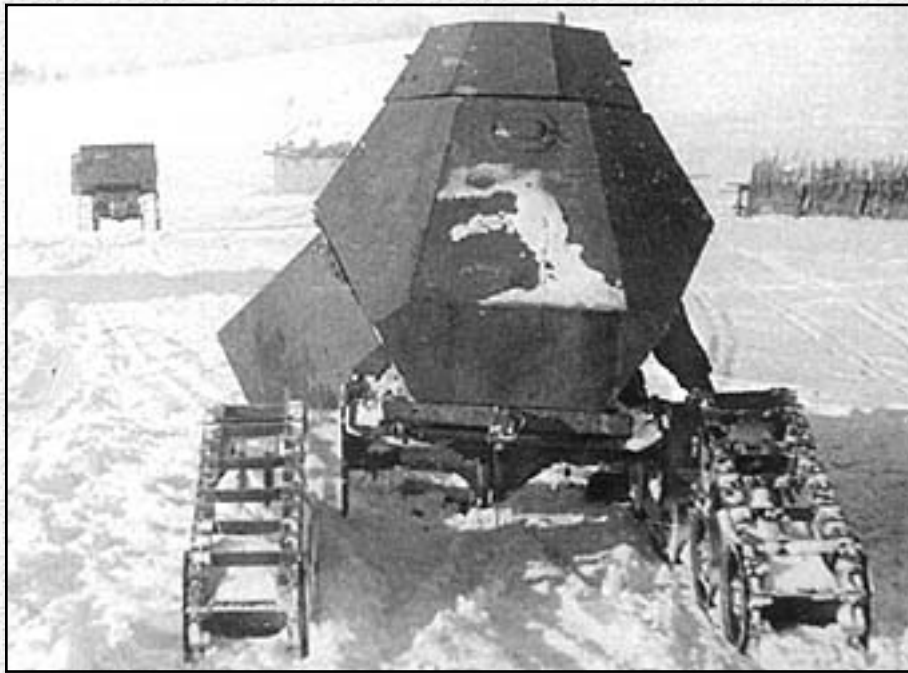
Trying to solve a problem of truck's movement over a snowy terrain in winter 1942 the new truck GAZ-SKh was developed (it was based on the chassis of the GAZ-AA). Instead of common wheels, the truck had the original track unit which has been developed before the Great Patriotic War (Chief-engineer - S.S.Nezhdanovsky). The driving-wheels were replaced with track

The BA-64Z with Nezhdanovsky's track unit. The front axle comes from the GAZ-AA, skis are from the GAZ-60.

unit, the front wheels were replaced with pair of a wide skis.

Then, the idea to install the BA-64 onto Nezhdanovsky's track unit suggested. From July 1943, the works on this idea started. The very first prototype was finished by January 1944. New vehicle received the BA-64Z designation ("Z" means "zimniy" - winter). The brakes, absorbers, the driving shaft, distribution box and the reserve wheel were removed from the new vehicle. The overall dimensions of the BA-64Z increased: length - 4560 mm, width - 2280 mm, height - 2020 mm. The full weight increased up to 2980 kilos.

On January 9, 1944, the first trials begun, but finished unsuccessfully: the BA-64Z stuck. It was dragged out by the GAZ-62 truck. From January 13, the trials resumed, now the BA-64Z towed the field gun. (Unfortunately, the report does not clarify the model, just mentioned "a field gun". The 76-mm ZIS-3 field gun seems to me most likely however).



The BA-64Z. Rear view.

The BA-64Z run very well, but fell into the ditch and damaged the skis. From January 30 to February 10, 1944, the BA-64Z successfully passed the overall trials. The average speed on the hilly snowy terrain was 7.6 km/h, on the firm road - 16 km/h. The maximum theoretical speed - 28 km/h - was not achieved because of weak engine. The car run with a big difficulties over the non-snowed flat terrain, and could not pass the hills at all if they weren't covered by snow. The tracks often collapsed. BA-64Z used too many

fuel: from 1.2 to 1.5 litres per kilometer.

Trials revealed another big problem of the BA-64Z: a quite low maneuverability. That was especially bad for wooded country, sometime it was need to saw off a tries to get a path. Because of these serious problems, the BA-64Z was considered as hopeless and all further works were cancelled.

REFERENCES:

[The BA-64 armored car](#)

[Specifications of Soviet tank guns](#)

Sources:

"The armored cars", NIIBT Poligon GBTU KA, Kubinka, 1944

"Vezdekhody RKKA", Armada #7

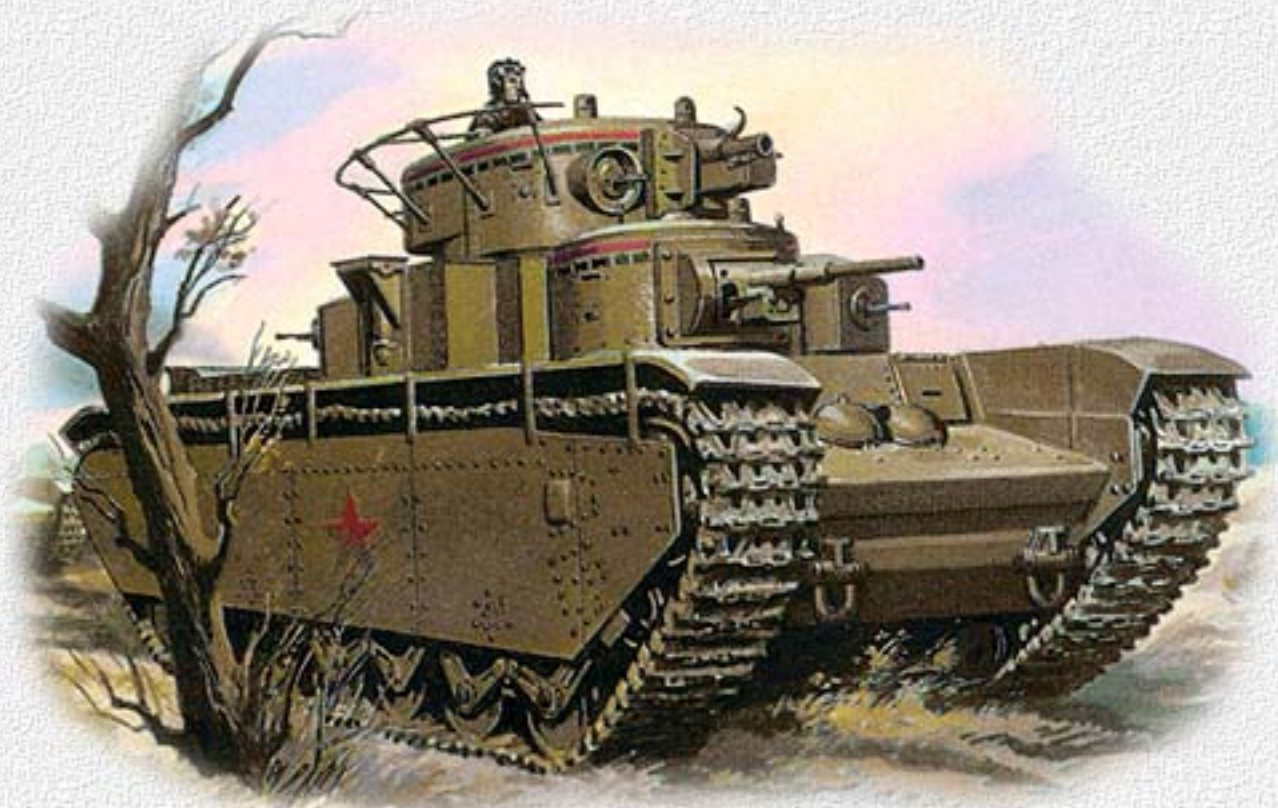
"M-Hobby" #4 1999.

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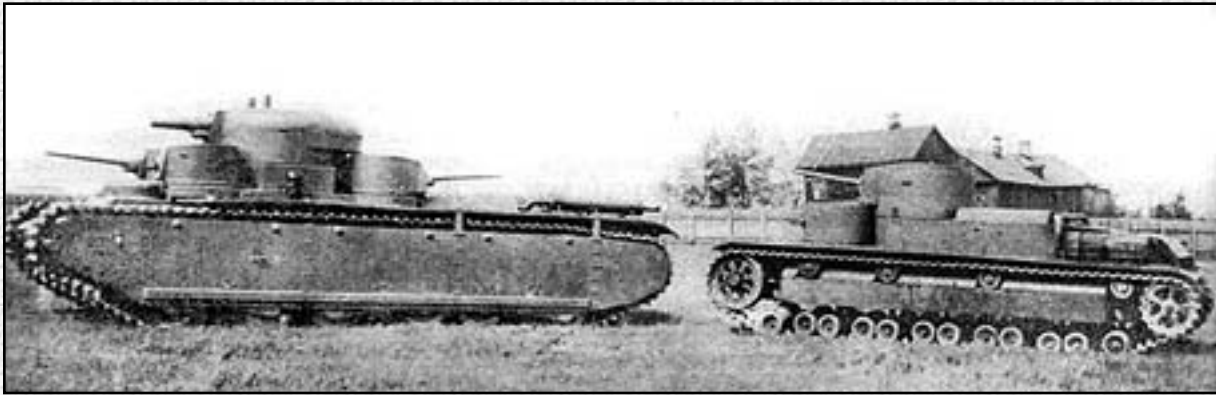
The T-35 Heavy Tank

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In December 1930, the USSR had undertaken work to develop a new breakthrough heavy tank, the T-30. This work began after the signing of an agreement between UMM RKKA and the General Design Bureau of the Artillery Department.

The first proposals were for a 50-ton vehicle armed with a 76-mm gun and five machine-guns. However, a lack of experience with such vehicles hampered the finishing of a plausible design - even on paper! At the beginning of 1932, the first sketches and a wooden prototype were created, but the T-30 project was canceled due to design problems (almost insuperable problems with running gear) which appeared during its development.



Prototypes of the T-35 (left) and the T-28 (right).

Another attempt was undertaken by the Auto-Tank-Diesel Section of the Economic Department of the OGPU. This was a special section that employed tank designers convicted during the Purges. As in the previous case, this project had too many serious problems and was also abandoned.



The T-35-1 on parade in Moscow. May 1, 1933.

Only foreign specialists could get the project off the ground. In March 1930, a small group of German engineers led by Edward Grotte arrived in the USSR. This group was assigned to the Special Design Bureau AVO-5 in Leningrad in the "Bolshevik" Factory. AVO-5 had already worked on the TG-1 project. As far as I understand, the TG-1 was intended only to teach Soviet engineers how to develop a heavy vehicle, it was not intended as full-functional production

vehicle. In August 1931, when the TG-1 was completed and tested all the German engineers were repatriated from the USSR. The AVO-5 was then reorganized.

The New design bureau was issued a directive by UMM RKKA: "By 1 August 1932, a new 35-ton heavy tank based on the TG-1 must be developed and built." The new project received the "T-35" designation. On February 28, 1932, G.G. Bokis (Deputy Chief of the UMM RKKA) was reporting to M.N. Tukhachevsky: "The work on the T-35 is going briskly, and should be completed on time."

On August 20, 1932, assembly of the very first prototype under the T-35-1 designation had been completed, and on September 1, it was shown to a special commission of the UMM RKKA. The tank made an impression on all the members of the commission. Outwardly, the T-35 looked like the English A1E1 "Independent" five-turret tank. Many

people believe that the T-35 was copied from the "Independent", however, the Russian Archives have no documents, which can confirm such conjecture. Without such documents, we have no right to suspect Russian developers; the question is still open.



The T-35A on trials.

The main turret was supposed to be armed with a powerful 76.2 mm PS-3 tank gun and one DT machine-gun, but because of a lack of PS-3 guns, a dummy gun was mounted instead. Later, the shortage of PS-3s remained, and the 76.2 mm KT Tank Gun used instead.

The transmission of the T-35-1 had been developed with experience gleaned from the TG-1. It consisted of the M6 petrol engine, the main

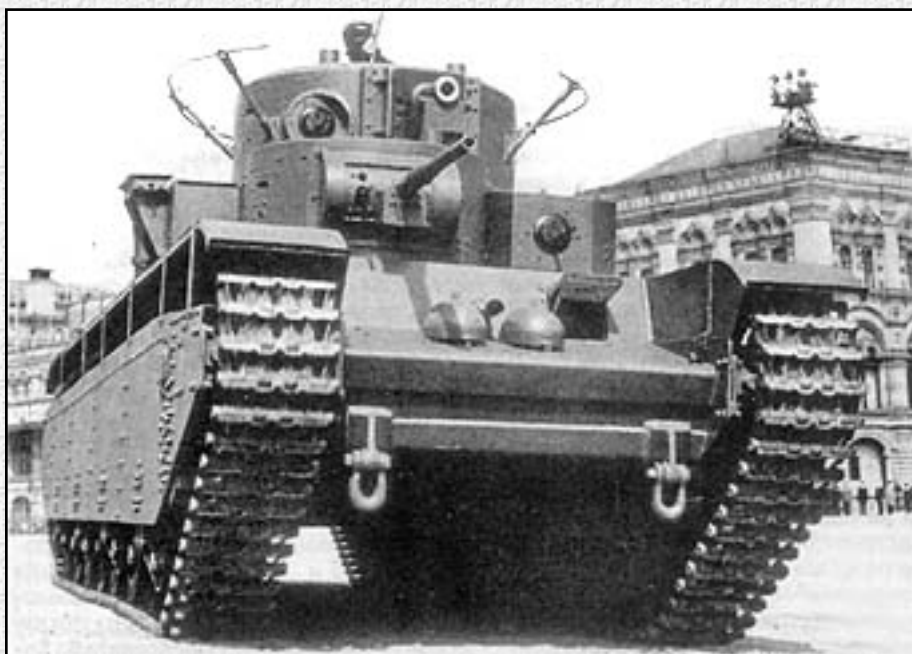
friction clutch, the gearbox and side clutches. Driving the tank was quite easy due to a well-designed pneumatic system.

Tests conducted in the autumn of 1932 revealed some defects in the transmission. Moreover, it was too complex and expensive for mass production, and all work on the T-35-1 had been canceled and the vehicle sent to Leningrad as a study aid for tank corps trainees.

In February 1933, new work on the T-35-2 began. As per Stalin's order, standardization of tank turrets for the [T-28](#) and T-35 was implemented. On the T-35-2 the new M-17 tank engine, a new gearbox, and an improved transmission were installed. All other parts were the same as on the T-35-1. This tank was also intended to be arm with the 76.2 mm PS-3 gun. The vehicle was completed in April 1933, and on May 1, it was shown on military parade in Leningrad while the T-35-1 was shown on parade in Moscow.



The T-35-2 on parade in Moscow. November 7, 1933.



The first production T-35A on parade in Moscow. May 1, 1934.

Both the T-35-1 and the T-35-2 were prototypes. Almost simultaneously, the first production model, the T-35A, was developing using experience from these prototypes. In May 1933, the Soviet Government ordered mass production at the KhPZ Factory. All documents and the T-35-2 prototype were sent here.

The T-35A had many changes, which distinguished it from its predecessors. The new vehicle had a longer chassis, smaller turrets, an improved hull, and some other alterations. In essence, it was a new vehicle, and so it had some teething troubles during its manufacture. I wish to notice, each T-35 was unique, since minor improvements were made in every tank, and therefore they were not true production vehicles because they didn't pronouncedly follow the base blueprints.

Different parts of the T-35 manufactured at different factories:

- Armored hulls at the Izhorskij Factory;

- Gearboxes at the "Krasnij Oktyabr" Factory;
- Engines at the Rybinskij Factory.

According to the production plan, all these factories should have started manufacture in June 1933, but due to unforeseen problems, they began in August 1933. Final assembly began on October 18, 1933, and was finished on November 1. The final assembly was usually aided by using hydraulic lifting jacks, but in this case, the hull was placed on an elevated assembly jig in order to install the final components such as the running gear,

turret, and armament.

The first production T-35A was put on parade in Moscow on May 1, 1934. Per a Governmental order of October 25, 1933, the KhPZ had to complete five T-35A tanks and one T-35B (with an M-34 engine) before January 1, 1934, but up to this date only one vehicle had been fully completed. The other three T-35A's were still unarmed, and the manufacture of the T-35B had not even started. The T-35B project was later abandoned at all.

The production of the T-35A was extremely expensive: a single tank cost 525,000 rubles - as much as nine [BT-5](#) light tanks. This was definitive reason why its manufacture was cancelled.

According to the plan of 1934, the KhPZ had to produce ten vehicles (T-35A). During production, the factory made some changes to cut production costs. However, factory engineers met with many problems. For instance, the tracks of the tank were too fragile, and the M-17 engine often overheated. The first vehicle had to be completed on August 20, 1934, but was not. However, the KhPZ built ten by the very end of 1934.



The T-35A Heavy Tank.

In 1937, the T-35 was modernised. Its gearbox, side clutches, electrical equipment, the drive shaft, and the oil tank were improved. In addition, engine silencers were installed inside the vehicle. Due to these changes, the reliability of the T-35 increased greatly.

However, the armor protection of the T-35 did not meet the

demands of modern warfare, but because the vehicle was already too heavy, it was unrealistic to increase its armor any more.

In 1937, the KhPZ began a plan to convert the T-35 to conical turrets. Production of the new tanks began at the end of 1938. According to KhPZ's records, total five tanks received conic turrets. Total production included one T-35-1, one T-35-2, and 61 production vehicles. The T-35 was the only production five-turret tank in the world.

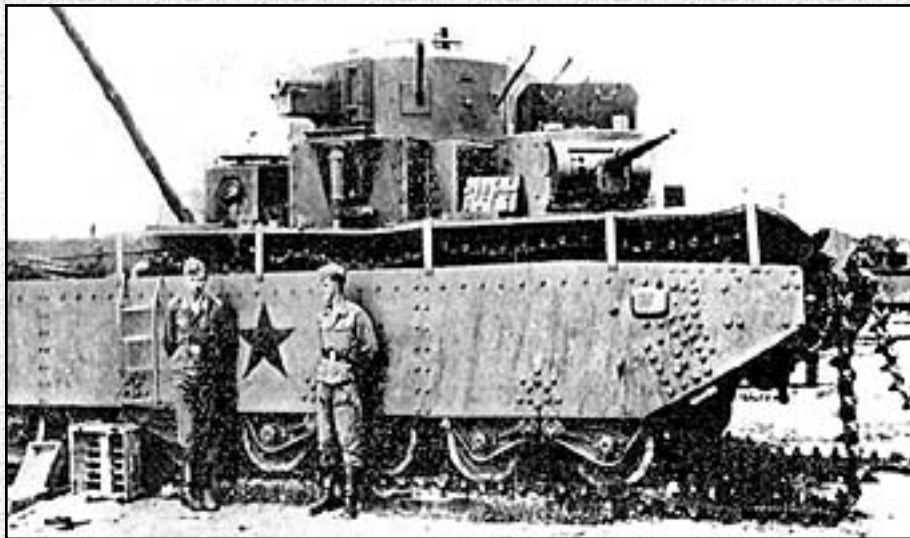


The T-35 with conic turrets.

The layout of the T-35 was optimal for a multi-turret vehicle. Five turrets were set up in two tiers and provided high firepower with one 76.2 mm gun, two 45 mm 20K guns, and three machine-guns. However, such a layout resulted in an excessive vehicle height (about 3.5 metres) and decreased its mobility on the battlefield.

In addition, the T-35 still had many problems with its engine and transmission. Unfortunately, these

defects weren't fully eliminated, but Soviet tankers still held this vehicle in high regard.



The Russian "Crocodile".

Outwardly, the T-35 was visually stunning with its huge dimensions, however its internal space was very cramped. When I visited Kubinka I was unable to get inside the T-35 (I'm 192 cm). The separate combat compartments were not connected with each other. Visibility from the vehicle was very bad, especially from the driver's position (he could see straight ahead and left only).

However, the greatest problem

was egress from a knocked out tank because the crew could escape only from roof hatches, and the crew from the main turret had to expose themselves at a 4-metre height under enemy fire.

The driver was in an even worse situation: his hatch could not be opened until the machine-gun turret rotated out of the way. If this turret was jammed, the driver couldn't escape at all. Escape from the rear turrets was also difficult due to the rounded antenna on the main turret. The tank crew could become "prisoners" of their own tank. The first production T-35's were sent to the 5th Heavy Tank Regiment RGK. On December 12, 1935, this regiment was reorganized into the 5th Separate Heavy Tank Brigade.



The T-35 and the T-26 from the 8th Mechanized Corps, abandoned at Dubno area. July 1941.

The brigade consisted of three Tank Battalions, one Training Tank Battalion, and some support units. On May 12, 1936, under the order of the Defense Minister, this brigade was attached to RGK. The unit was formed to increase the support of infantry and tank troops during breakthroughs of heavily-fortified defense lines.

Deployment of the T-35 revealed its poor maneuverability. For example, one T-35 commander reported: "The tank was able to pass only a 17° slope. It couldn't even traverse a large puddle."

The following directive was addressed to the headquarters of the 3rd Heavy Tank Brigade RGK and regulated the crossing of bridges:

- "1. For single-span bridges - only one vehicle at a time;
2. For multi-span bridges - several vehicles at the same time but with distance of 50 metres between them;
3. In all cases, the speed of the tank should not exceed 15 km/h."



The captured T-35. July 1941.

Before the Great Patriotic War, the T-35 didn't take part in any military conflicts. Any mention in Western (and some Russian) accounts about T-35's that served in the Winter War are false.

On 27 June 1940, a conference opened in Moscow: "On Weapons of AFVs of the Red Army." During debates, a question concerning

the T-35 had arisen. Some officers thought that all T-35's should be converted to heavy self-propelled artillery (like the SU-14), others wanted to give all the T-35's to military academies. Interesting, almost nobody raised an opinion to keep them as vehicles of the first line.



The T-35A on its way to the front. Moscow area. October 22, 1941.

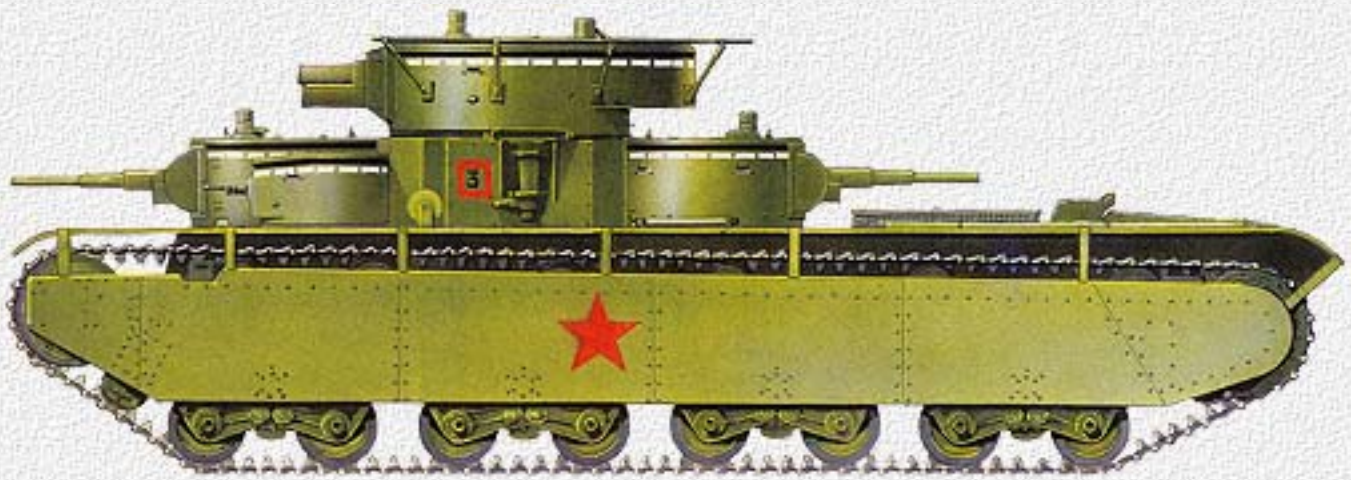
is on display in the Kubinka tank museum.

However, due to the active reorganization of tank forces of the Red Army, and the formation of the new mechanized corps, it was decided that these vehicles "should be depleted by attrition in operational units." As a result, all vehicles were collected in the 67th and 68th Tank Regiments of the 34th Tank Division of the 8th Mechanized Corps (Kiev Special Military District).

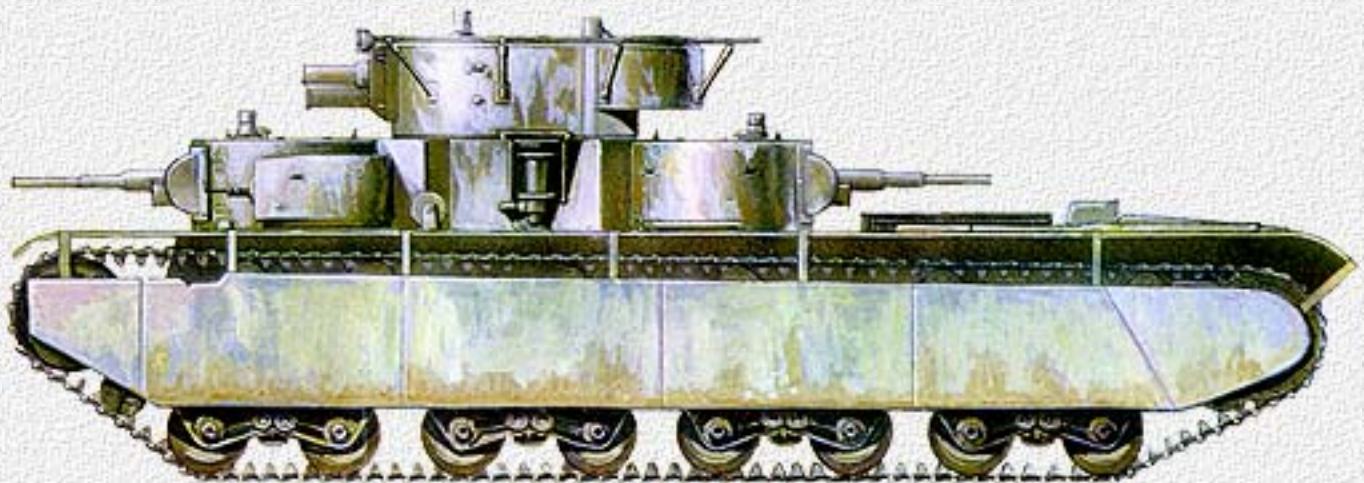
Today, only one T-35 survives. It



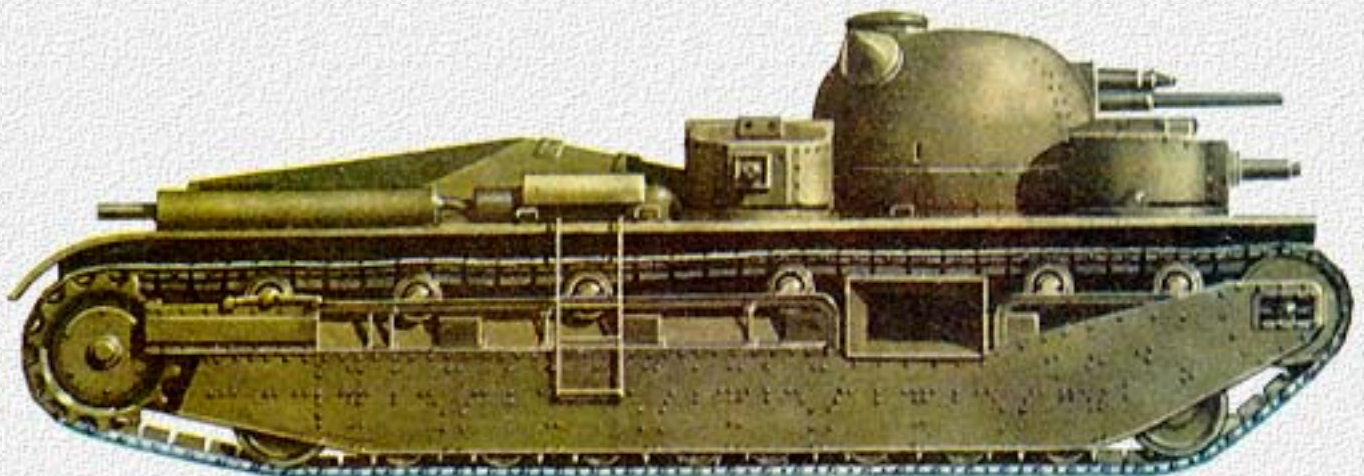
The T-35-1 heavy tank in parade colors. May 1, 1933. (V.Lobachev)



T-35A in standard camouflage of 1930th. 3rd vehicle, 1st Tank Platoon, 3rd Tank Battalion, 5th Heavy Tank Brigade. 1936. (V.Lobachev)



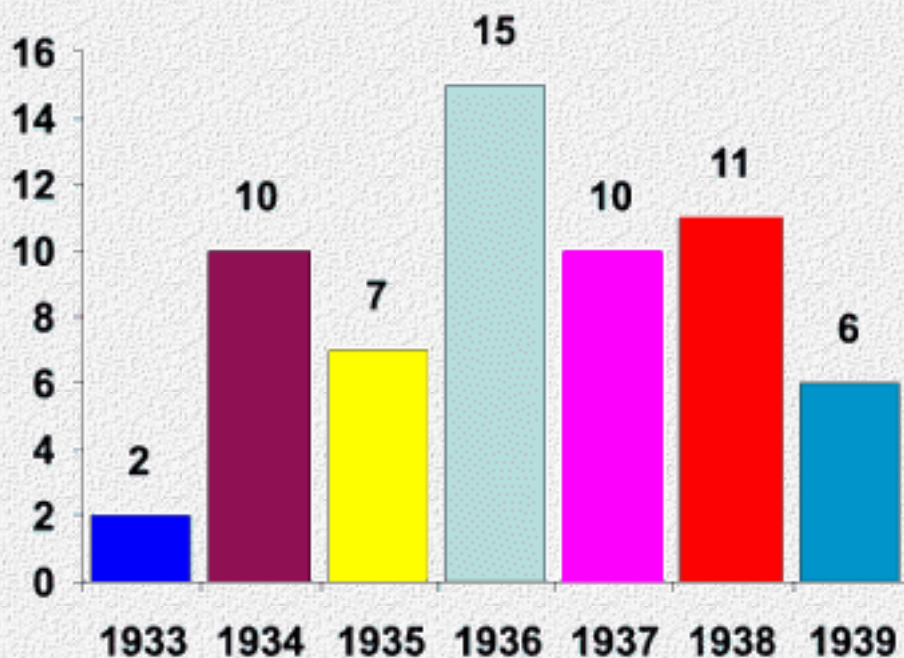
T-35A in standard winter camouflage. Military Academy of Mechanization and Motorization Tank Regiment. Winter 1941. (V.Lobachev)



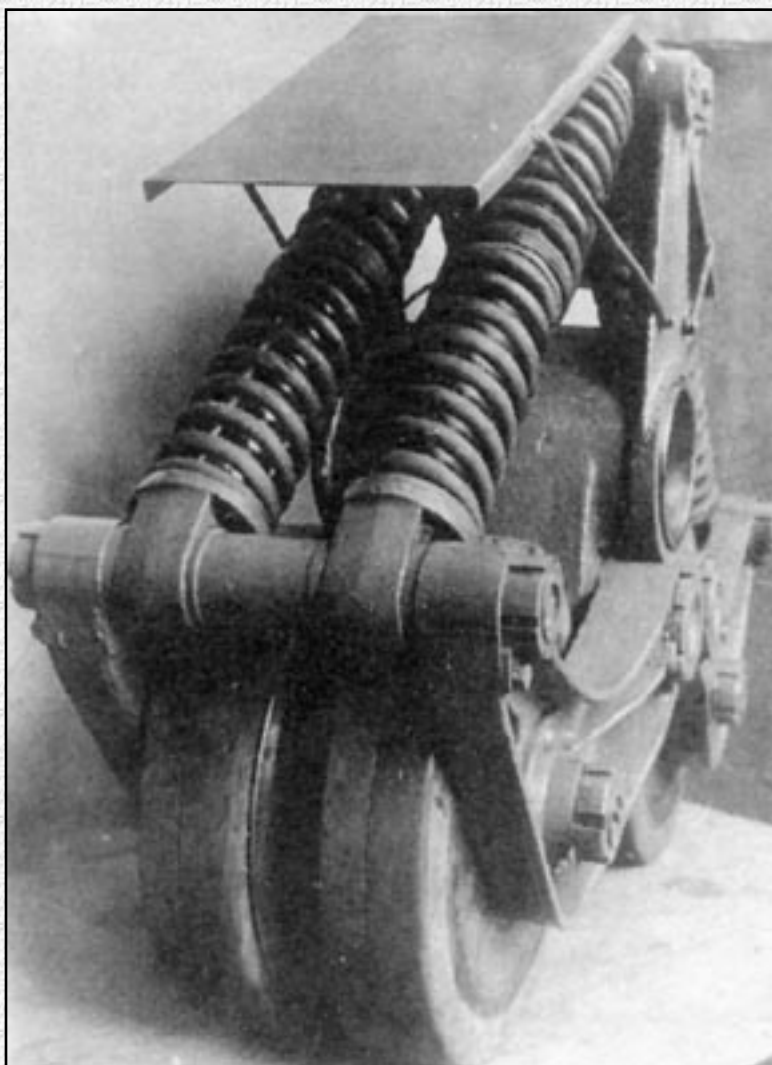
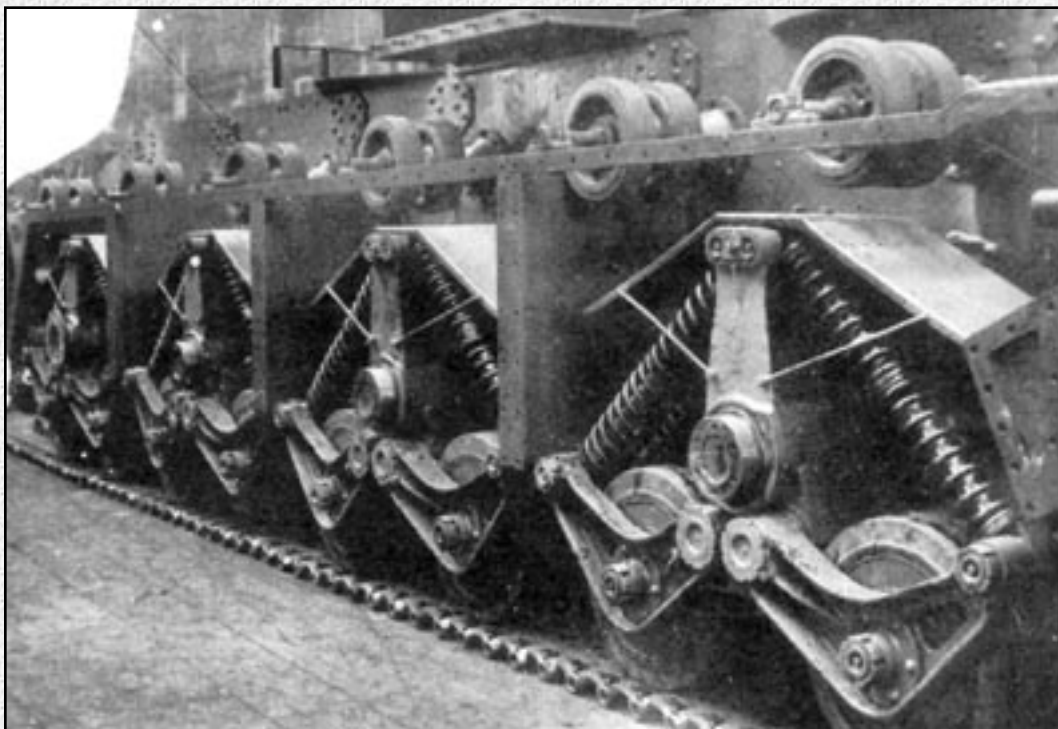
British "fellow": A1E1 "Independent" Heavy Tank. (M.Petrovsky)

Parameter	A1E1 "Independent"
Crew, men	8
Weight, kg	31 500
Armament	1 x 47 mm gun 4x7.62 mm TMG
Armor, mm	13-28
Engine	"Armstrong-Siddley", 398hp
Max. speed, km/h	32
Range, km	320

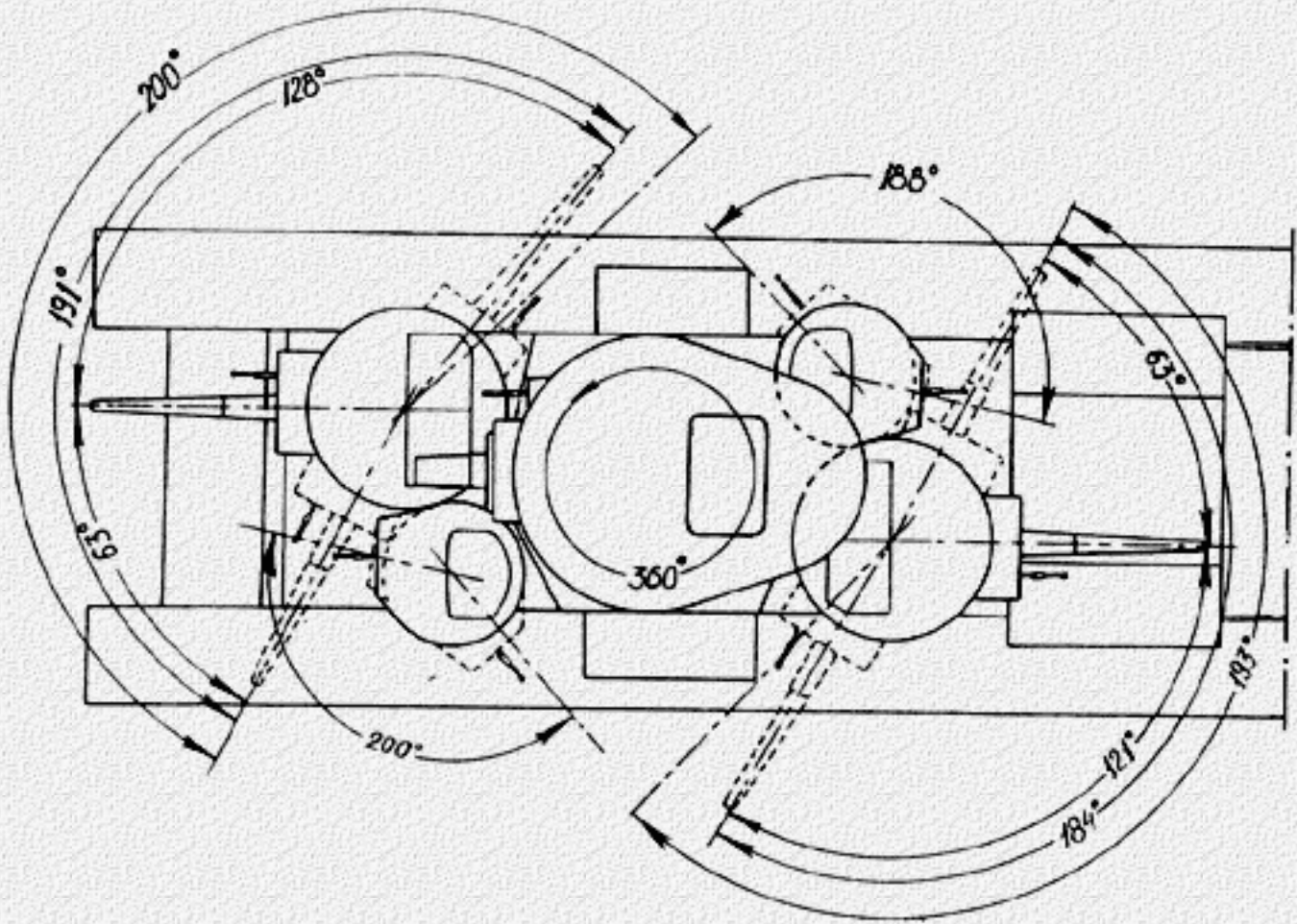
Production of the T-35



The running gear of the T-35A tank



Sectors of fire of the T-35A



REFERENCES:

[The crew of the T-35](#)

[Losses of T-35 tanks](#)

[Profile and armoring scheme for the T-35A Heavy Tank](#)

[Specification of Soviet tanks](#)

[Specifications of Soviet tank guns](#)

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Sources:

M.Kolomiets "The T-35 heavy tank", 1995

M.Baryatinsky "Soviet tanks in the Second World War", 1995

"Bronekolleksiya" #2 1995

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The Location and Duties of T-35's Crew

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Crew man	Rank	Location and Duties
Commander	Starshij Leitenant (Senior lieutenant)	in the turret #1 (main turret); to the right from the gun; command the tank, loads the main gun, fires the DT TMG
Commander's Assistant	Leitenant	in the turret #2 (frontal turret with a gun); fires of the 45-mm gun; responsible for operational condition of the tank
Junior Tank Technician	Voentechnic Vtorogo Rankga	in the steering compartment; drives the tank; responsible for operational condition of the tank
Tank Driver	Starshina	in the turret #3 (frontal turret with a machine-gun); fires of the machine-gun, responsible for operational condition of the engine, assistant of the Junior Tank Technician
Commander of the Main Turret	Mladshij Komandir Vzvoda	to the left from the main gun; fires of the main gun; responsible for operational condition of the main turret
Commander of the Turret #2	Otdelennij Komandir	to the right from the 45-mm gun; loads the gun; responsible for operational condition of the turret #2
Commander of the turret #4 (rear turret with a gun)	Otdelennij Komandir	to the left from the gun; fires the 45-mm gun; assistant to the Commander of the Main Turret; responsible for operational condition of the turret #4
Junior Tank Driver	Otdelennij Komandir	in the turret #4, to the right from the gun; loads the gun; responsible for operational condition of the running gear of the tank
Commander of the Turret #5 (rear turret with a machine-gun)	Otdelennij Komandir	in the turret #5, fires the machine-gun; responsible for operational condition of the turret #5
Senior Radio Operator	Otdelennij Komandir	in the main turret; operates the radio; loads the main gun
Senior Tank Driver	Mladshij Koandir Vzvoda	outside the tank; responsible for operational condition of the transmission and the running gear of the tank
Motor-mechanic	Mladshij Technic	outside the tank; responsible for operational condition of the tank's engine

Author:

[Valeriy Potapov](#)

Sources:

M.Kolomiets "The T-35 heavy tank", 1995

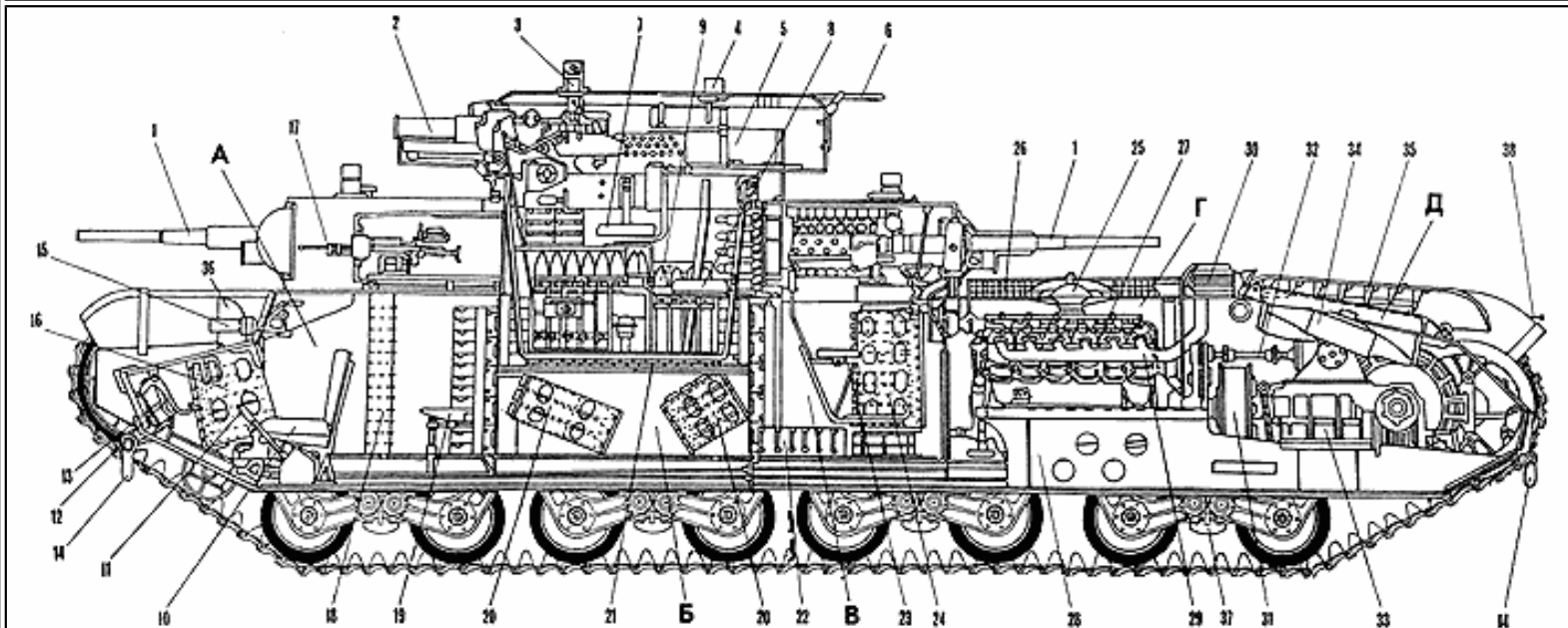
M.Baryatinsky "Soviet tanks in the Second World War", 1995

"Bronekollektsiya" #2 1995

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Profile of the T-35A Heavy Tank interior



Компоновочная схема танка Т-35А:

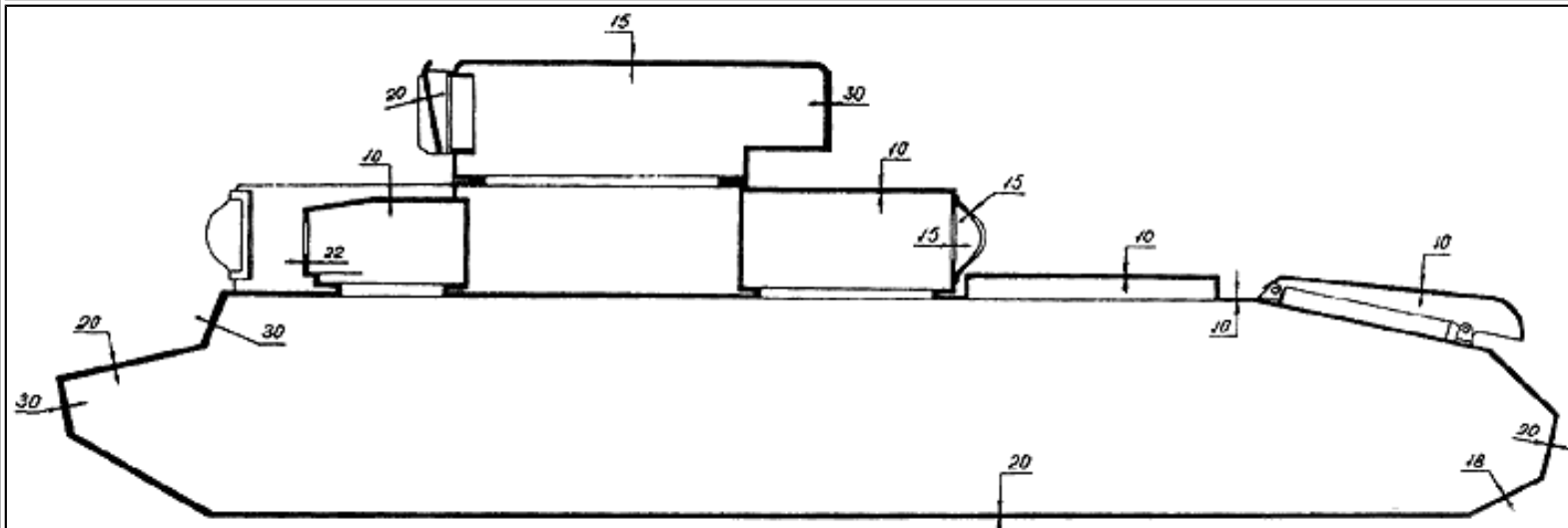
1 — 45-мм пушка, 2 — 76-мм пушка, 3 — перископический прицел ПТ-1, 4 — бронировка выхода антенны, 5 — радиостанция 71-ТК-1, 6 — поручневая антенна, 7 — сиденье наводчика 76-мм пушки, 8 — сиденье радиста, 9 — укладка 76-мм артвыстрелов на стенке корпуса, 10 — сиденье механика-водителя, 11 — рычаг управления бортовым фрикционом, 12 — педаль главного фрикцио-

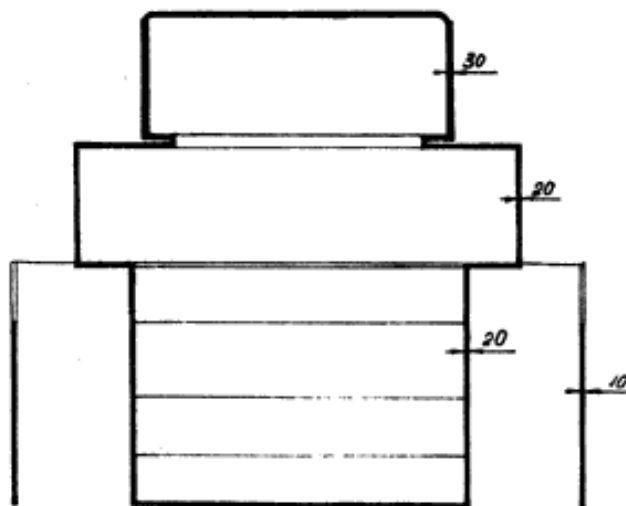
на, 13 — педаль акселератора, 14 — буксирная серьга, 15 — сигнал, 16 — носовая укладка 45-мм артвыстрелов, 17 — пулемет ДТ, 18 — стеллажи пулеметных магазинов, 19 — походное сиденье стрелка-пулеметчика, 20 — уклады 76-мм артвыстрелов под верхним настилом пола главной башни, 21 — верхний настил пола главной башни, 22 — укладка пулеметных магазинов на

полу отделения задних башен, 23 — сиденье заряжающего, 24 — укладка 45-мм артвыстрелов на борту корпуса, 25 — воздушный фильтр, 26 — отверстия для притока воздуха к радиаторам, 27 — двигатель М-17, 28 — подмоторная рама, 29 — выпускной коллектор, 30 — глушитель, 31 — главный фрикцион, 32 — клановый вал привода к вентилятору, 33 — коробка передач, 34 — вен-

гильатор, 35 — жалюзи воздухопритока к вентилятору, 36 — броневой колпак фары, 37 — башмак, ограничивающий прогиб гусеницы, 38 — распылитель дымового прибора А — отделение передних башен с постом управления механика-водителя, Б — отделение главной башни, В — отделение задних башен, Г — моторное отделение, Д — трансмиссионное отделение

Armoring Scheme of the T-35A





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The KV-1 Heavy Tank

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The KV-1e Heavy Tank Model 1941



The "founding father" of the KV-1: the twin-turret SMK heavy tank. August 1939.

This tank first appeared in the Winter War. It was a general test of this tank. Having excellent protection and a powerful diesel engine, it was heavily armed with a 76.2 mm gun and three machine-guns. This tank was a king of battlefields until the introduction of German 75 mm guns. It had a bow machine-gun, a coaxial machine-gun, and a rear machine-gun to prevent infantry assaults from the

rear. The chassis of this tank was used for several of assault guns and tanks. Later, the KV-1 was upgraded to the much more common [KV-1s](#) modification.

In October 1938 a large group of students visited the SKB-2 of the Kirovsky Tank

Factory (Leningrad). The new twin-turret SMK (Sergey Mironovich Kirov) heavy tank was in the works at that time. The new students received the task of designing a new heavy tank, based on the SMK, but with a single turret.

During their work they were faced with many problems. Some of the problems resulted from the unreliability of the planetary transmission, for example. At that time the Czech S-2a tank was tested at the Kubinka proving ground (the High Command planned to buy some). Some students were ordered to check this tank and steal all the good ideas...



The "founding father" of the KV-1: the T-100 heavy tank. 1939

In December 1938 it was contemplated to build two twin-turret SMK tanks, but J.Y.Kotin (Chief of the SKB) and I.M.Zaltzman (Director of the KTZ) offered a new idea - to build one SMK and one new single-turret heavy tank.

This idea was welcomed, but final approval was only given by order

#45ss of the Defense Council of the USSR on 27 February 1939.

The new tank received the KV (Klim Voroshilov) designation. Work on this tank began on February 1, 1939, even before official permission was given to start. Work on the new tank went quickly, on April 9 the technical mockup was finished and by September 1, 1939 the first tank was already built and tested.



The prototype of the KV-1 heavy tank.

The KV tank inherited several ideas and features from its predecessor - the SMK: the hull, elements of the transmission, optic devices and so on. It had the powerful V-2 diesel engine. There were two guns mounted in a single turret: one 76.2 mm gun and one 45 mm gun. It had only one machine gun: the 7.62 mm DT TMG mounted in the hull.

On September 5, 1939 the KV was sent to Moscow where it was shown (on September 25) to the Soviet Government. After that the tank was returned (on October 8) to Leningrad, it was sent to the proving ground for tests. However, after the Winter War began, the tests were cancelled and the

tank was sent to the front.



The KV-1e with additional armor. September 1941.

The KV, SMK and the T-100 tanks served in 91st Tank Battalion, 20th Heavy Tank Brigade where the KV tank was the best. It must be noted that the 45 mm gun was already replaced with one coaxial 7.62 mm DT TMG and another one DT TMG which was placed in the turret rear to protect the tank from rear infantry assault.

The KV-1 heavy tank officially served in the Red Army from 19 December 1939 when V.Molotov signed order #443ss.



The KV-1e is going to battle in outskirts of Leningrad. September 1941.

In May 1940 the yearly production plan was increased from 50 units to 200 units. The ABTU was worried that the tank had still not completed its tests and might contain many hidden defects.



So, in May 1940 the tank tests began again on the Kubinka proving ground and also near Leningrad. After running 2648 km some serious defects were found in the transmission, chassis and gear-box. The engineers of SKB offered to stop production until all the defects were eliminated. However, the production plan was already signed, so the production

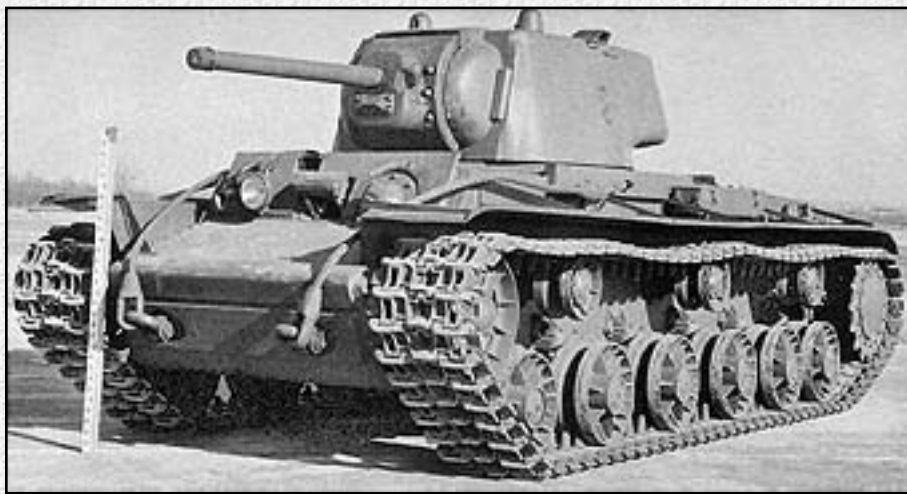
The KV-1 Heavy Tank Model 1939.



The KV-1 Model 1939 heavy tank.

continued anyway.

At the end of 1940 the 76.2 mm L-11 tank gun was replaced with the new, more modern F-32 gun. This version of the KV was also known as the KV-1 model 1940. This vehicle received a new, more powerful V-2k diesel engine of 600hp. In the spring of 1941, in response to German information, a new decision was made: to increase the armor of KV-1 using additional armor plates (armor shields). New modification was named KV-1e ("e" means "ekranirovaniy" or "with shields").



The KV-1 heavy tank model 1941. This tank was sent to the Aberdeen (USA) and then evaluated by American engineers.

At the beginning of the Great Patriotic War the Red Army possessed 639 KV-1 tanks. In 1941 the KV-1 heavy tank was able to destroy any German tank. There are some accounts when a single KV-1 tank delayed whole German armies for days.

A single KV-1 made a stand near a road not far from Ostrov (Baltic states) and delayed the whole German tank army.



A destroyed KV-1 heavy tank. Stalingrad, autumn 1942.

The battle casualties: 7 German tanks, an anti-tank battery, one 88 mm AA-gun and all its crew, 4 halftracks "Hanomag", and 12 trucks. This tank was destroyed on the next day with German 88 mm AA-gun. The KV-1 tank could be destroyed only with 88 mm heavy AA-guns or with 105 mm howitzers. The 105 mm howitzer couldn't penetrate the KV's armor but could immobilize it with a track hit.

However, most KV's weren't destroyed by enemy, they were lost because of technical failures and abandoned by their crews because of a lack of repair time. Here is a report from the commander of the 10th Tank Division, 15th Mechanized Corps: "We have lost 56 tanks in total (of 63 tanks - **Valera**) where 11 tanks were knocked out in battle, 11 lost without a trace, and 34 were abandoned by their crews due to technical failures".

In the 8th Tank Division, 43 tanks (of 50 tanks total) were lost, where 13 were destroyed in battles, 2 sunk in swamp, and 28 were abandoned due to breakdowns.



The KV-1 heavy tank with the PT-34 mineclear device.

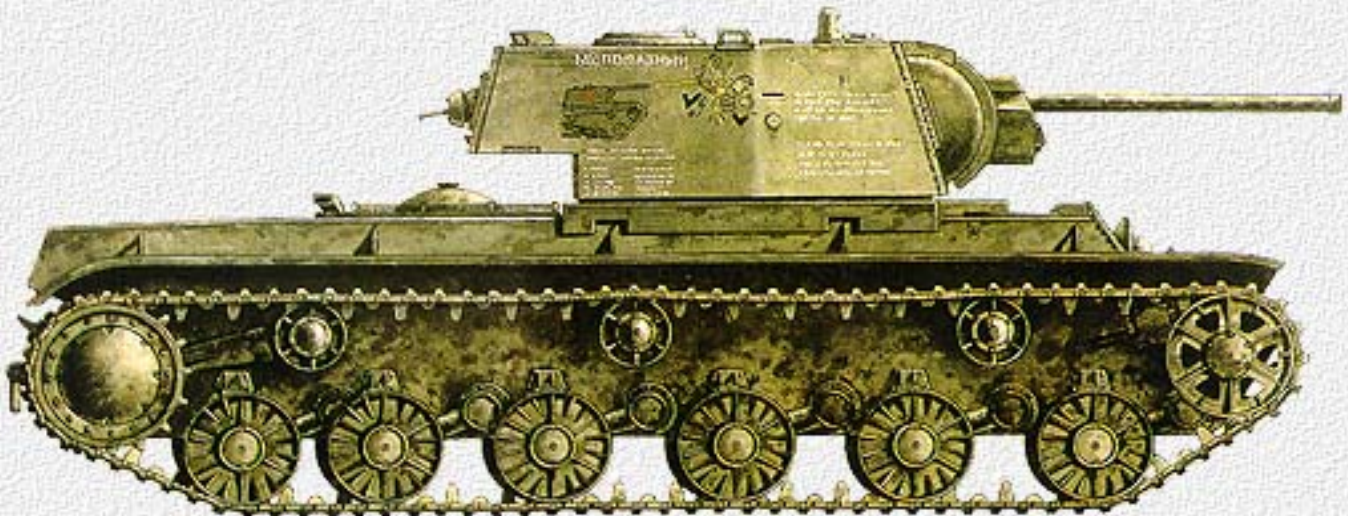
In July 1941 the F-32 gun was replaced with a new 76.2 mm ZIS-5 gun -an advanced and more powerful gun. It was similar to the F-34 gun that was mounted on the [T-34/76](#) medium tank. The new KV-1 model 1941 also had an improved cast turret (instead of welded) with thicker armor.

In autumn 1941, the Kharkov Factory was evacuated. Therefore

100 KV-1 tanks were equipped with M-17 petrol engines that were normally used for T-35 heavy tanks.

In 1942, work on a new, lightened model of the KV-1 was undertaken. The new tank was named KV-1s where the "s" suffix meant "skorostnoy" or "fast." Many tanks and projects were based on the KV-1: KV-8 flame tank and several experimental machines

including a tank with an 85 mm gun named "Object 220."

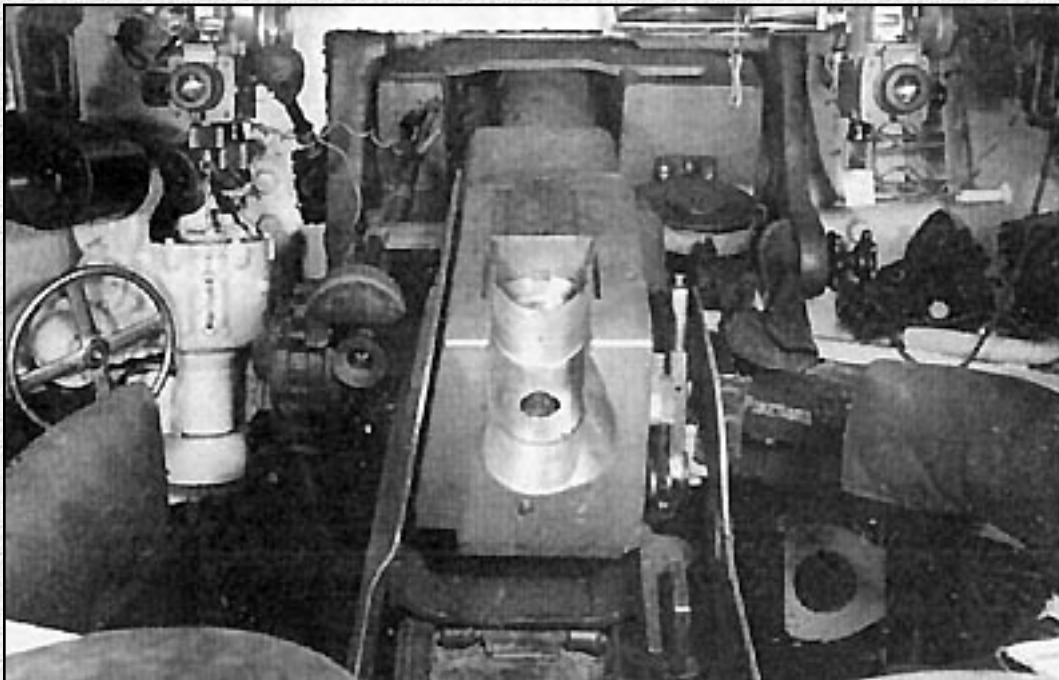


The KV-1 Model 1941 heavy tank of the 12th Tank Regiment of the 1st Moscow Motorised Division. April 1942.

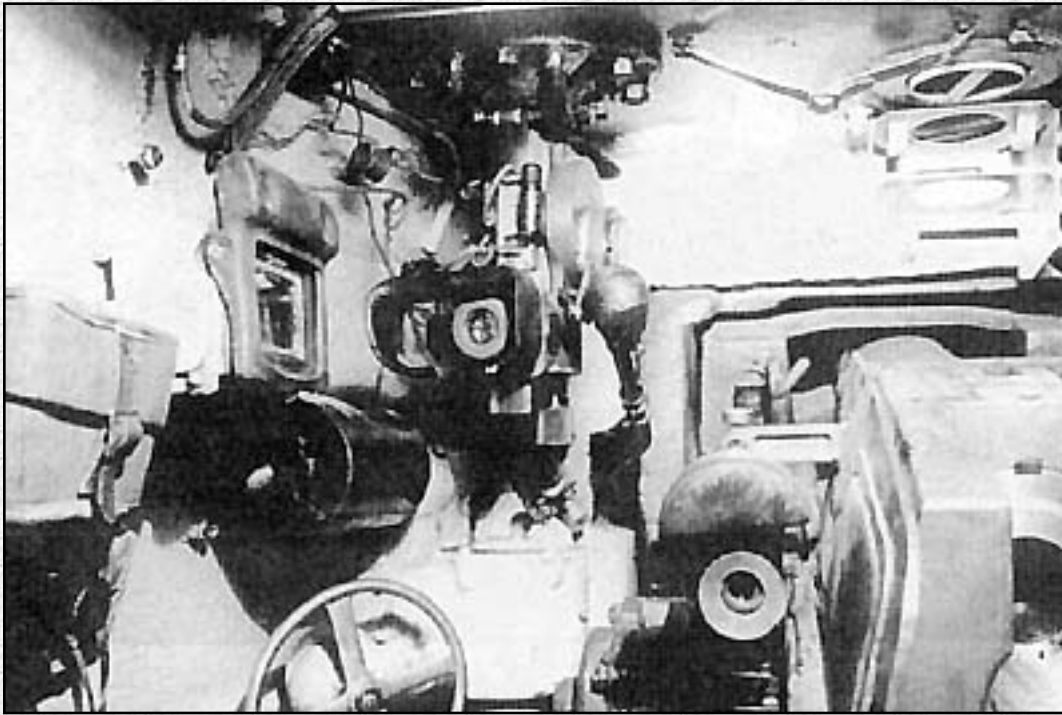
The full list of KV series:

- KV-1 - a heavy tank of 46-48 tons, armed with a 76 mm gun. Production.
- [KV-2](#) - heavy assault tank, armed with a 152 mm howitzer. Production.
- KV-220 - a heavy breakthrough tank of new generation, weight 63 tons, armed with a 85 mm gun. Experimental, but took part in battles.
- KV-222 - a heavy tank with 90-105 mm armor, weight of 51 tons, armed with a 76 mm gun. Experimental, but took part in battles.
- KV-3 ("Object 223") - a heavy 75-ton tank. It supposed to be armed with a 107 mm F-42 gun, and then with a 107 mm ZIS-6 gun. Manufactured with the standard turret of KV-1. Experimental, but took part in battles.
- KV-4 ("Object 224") - a project of superheavy breakthrough tank of a weight from 85 tons to 110 tons. Experimental.
- KV-5 ("Object 225") - a project of a 100-ton breakthrough tank for increasing a firepower of a fortified sectors (like German "Maus"). Armed with a 107 mm ZIS-6 gun. Experimental.
- KV-6 ("Object 226") - a heavy engineer-flamethrower tank. Experimental.
- KV-7 ("Object 227") - two variants of a turretless KV: first was armed with two 76 mm guns and second was armed with one 76 mm gun and two 45 mm guns. Both tanks have the same index (KV-7). Experimental.
- [KV-8](#) ("Object 228") - a flamethrower tank. Production.
- KV-9 ("Object 229") - a fast variant of KV-1, with lighter armor, 122 mm U-11 howitzer and new transmission. Experimental.

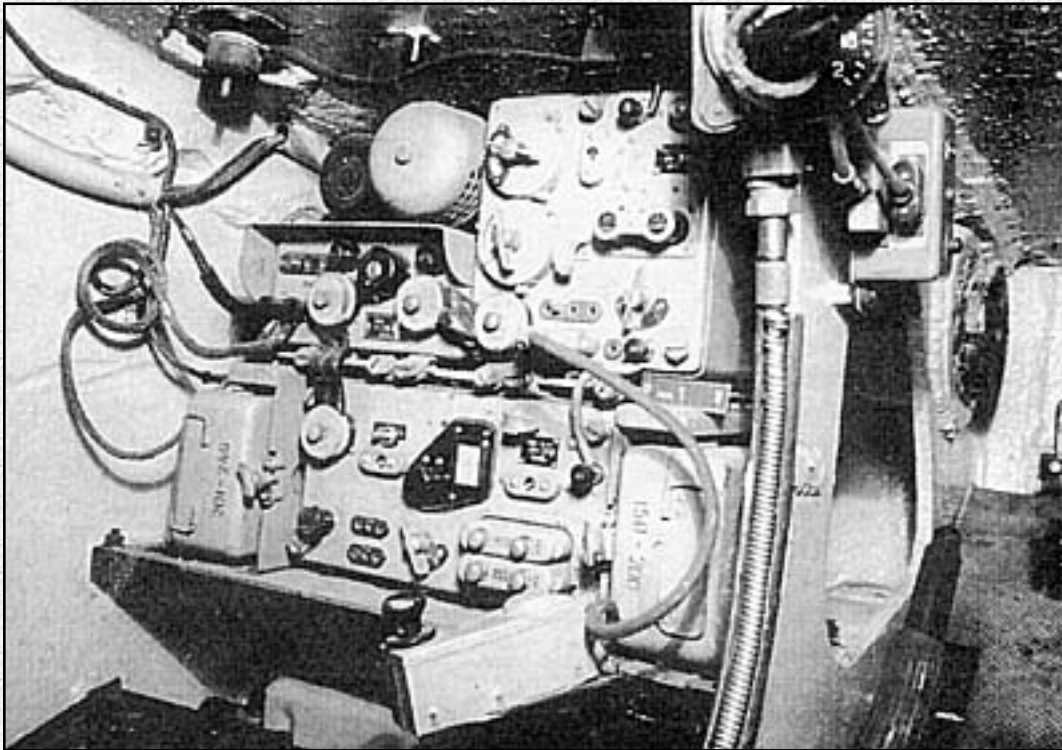
- KV-10 ("Object 230") - these is a variant reading in an archives. Either a rocket tank KV-1K (armed with rockets) or an unfinished KV-85. Experimental.
- KV-11 ("Object 231") - again, there is a variant reading in an archives. Experimental.
- KV-12 ("Object 232") - a heavy chemical tank for making a smoke screens. Experimental.
- KV-13 ("Object 233") - a fast medium tank of a heavy armoring. Experimental.
- KV-14 ("Object 236") - heavy assault gun also known as [SU-152](#). Production.
- [KV-1S](#) ("Object 238") - a high-speed variant of KV-1, with lighter armor and new transmission. Production.
- KV-8S ("Object 238") - a variant of flamethrower tank on chassis of KV-1S. Production.
- KV-85 ("Object 239") - a KV-1S with turret of IS-1. Production.



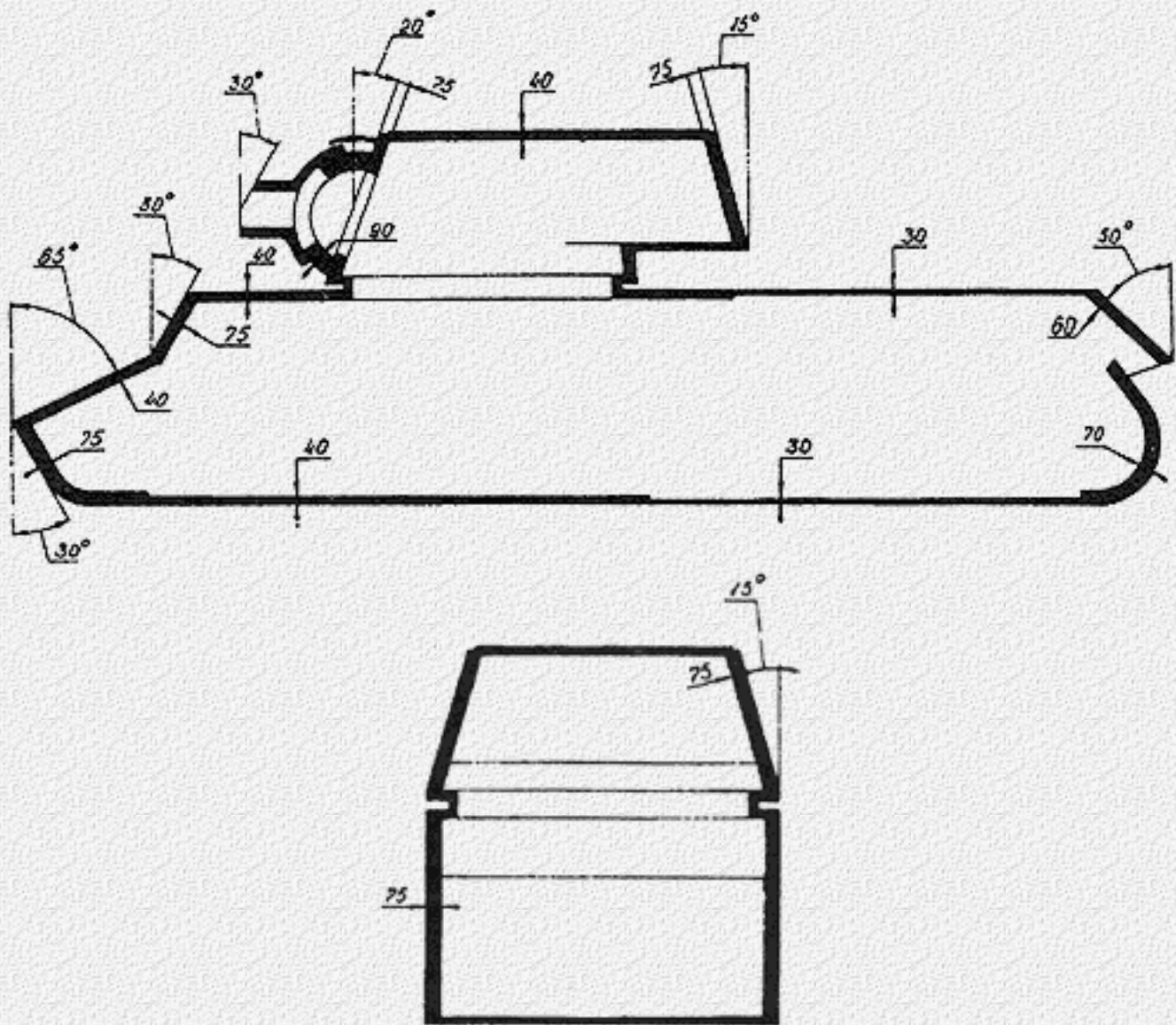
Interior view of the KV-1 with cast turret and the ZIS-5 gun mounted in it. To the left - the loader's station, to the right - the commander's station.



The loader's station. You can see there two sights: the telescopic sight TMFD (alongside the gun) and the periscopic sight PTK.



The command KV-1. The radio station 10-R.



REFERENCES:

[The profile of the KV-1](#)

[Specification of Soviet tanks](#)

[Specifications of Soviet tank guns](#)

Sources:

"M-Hobby" #5-6 1997

V.Gagin "Heavy breakthrough tank Klim Voroshilov" Poligraph, 1996

Janusz Magnuski "Ciezki Czolg KW", 1997

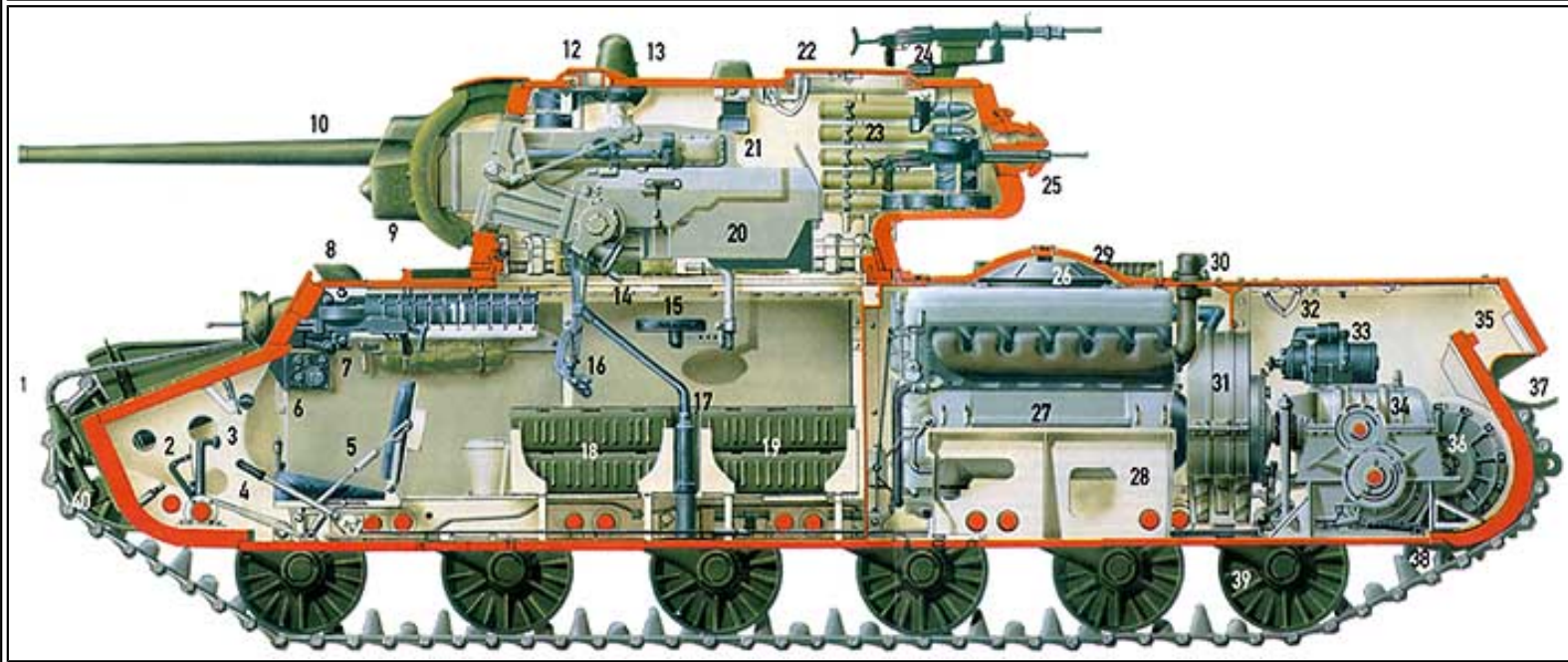
"Soviet heavy tanks in WWII" Tornado

"Bronekolleksiya" #1 1996

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The Profile of the KV-1 Heavy Tank Model 1941



Sources:

Janusz Magnuski "Ciezki Czolg KW", 1997

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The KV-1S Fast Heavy Tank

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The KV-1S Heavy Tank Model 1942. Berlin, April 1945.

According to one of the KV-1 designers: "During 1942 we were still in need of a reliable heavy tank. That's why we were defeated in Crimea and at Kharkov. The [KV-1](#) completely discredited the concept of a heavy tank."



Some Red Army high commanders demanded that all production of heavy tanks be stopped. Others suggested development of an "universal tank," something between a heavy and medium tank. By the way, in the 1960's-1970's tank designers around the world came to the conclusion that it was the right decision.

Soviet tank builders tried to develop such a tank. This tank was named the KV-13. It contained many brilliant ideas (some of those ideas were applied in the IS-2 tank),

however it never served in the Red Army.

At this time, a new decision was made to fully re-design the KV-1. Soviet tank designers wanted to develop a new KV with lighter armor and higher speed - like the [T-34-76](#) medium tank. The new tank was named KV-1S where "s" letter means "skorostnoy" or "speed". The KV-1S was lighter than its predecessor by up to 5 tons. The thickness of the frontal armor was lowered from 90 mm to 75 mm. The rear hull was re-designed. The existing road wheels were replaced with newer, lighter ones. The KV-1's transmission was re-designed as well.



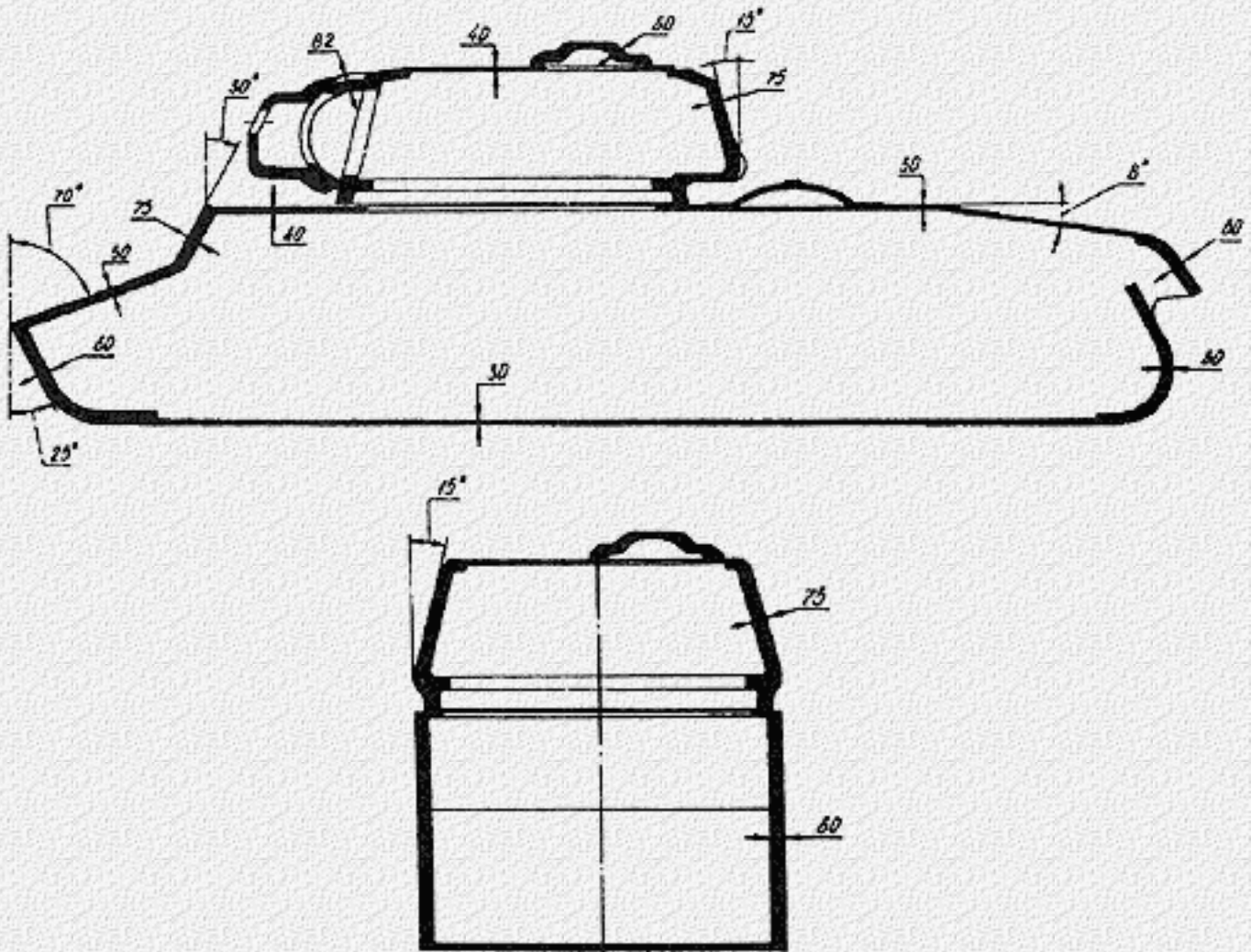
The old gear-box was replaced with a new one and the tank received a new turret with a commander's cupola (the first Soviet tank with a commander's cupola was T-50 light tank). Both ZIS-5 or F-34 guns could be mounted on this turret. In addition, the new tank was armed with four machine-guns: the coaxial MG, the bow MG, the AA machine-gun,

and the MG in the rear of the turret. Also, new tracks (608 mm width) were designed specially for this tank.

In the summer of 1942, the KV-1S prototype was tested. On August 20, 1942, the production of this tank had begun. However, when the KV-1S appeared in the war theatre, the Red Army was already in need of a tank with thicker armor and better protection. A total of 1370 KV-1S were built. In April 1942 its production was cancelled. Many tanks were sent in tank brigades because the reorganization of the Red Army had not begun yet. The KV-1S took part in all major operations of the Red Army including the Berlin operation.



**The KV-1S Heavy Tank Model 1942 of the 5th Independent Guards Tank Regiment.
Stalingrad, December 1942.**



REFERENCES:

[Specification of Soviet tanks](#)

[Specifications of Soviet tank guns](#)

Sources:

"M-Hobby" #5-6 1997

V.Gagin "Heavy breakthrough tank Klim Virishilov" Poligraph 1996

"Bronekolleksiya" #1 1998

"Soviet heavy tanks in WWII" Tornado

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The KV-2 Heavy Assault Tank

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The prototype of the KV-2 heavy tank.

On December 19, 1939, [the KV-1 Heavy Tank](#) was accepted for the service. At that time, the KV-1 took part in combat tests on the Russian-Finnish War (the Winter War). During those battles, the Soviet High Command came to the conclusion that the heavy tank with more powerful armament is highly needed to combat with enemy's bunkers, pillboxes and other fortifications.

The North-Western Front HQ ordered first four KV-1 tanks from

experimental party must be armed with 152 mm howitzers. To do this, the best engineers from KTZ's design bureau were summoned. After two weeks a new project was completed. In a first time engineers decided use the 152 mm mod.1909/1930 howitzer, but later it was replaced with more modern 152 mm M-10 Howitzer Model 1938/1940. A new, bigger turret was designed to accept such heavy cannon. That turret was named "MT-1".

At the beginning of 1941, the this tank was renamed to KV-2. Before this, the KV-1 called as "The Tank With a Small Turret", the KV-2 called as "The Tank With a Big Turret". The MT-1 turret was placed on the chassis of a twin-turret experimental tank instead of small turret (a large turret was also removed from the hull). On February 10, 1940, first trials were conducted. At the time, Soviet tank designers weren't very experienced in vehicles of such a heavy weight. They added a small lid on the the howitzer's barrel. That lid was intended to prevent a gun from the dust, shell's fragments and bullets. However, after the first shot this lid was torn away, after that it was never used.



A Giant and a Lilliputian. The KV-2 and the T-26 tanks.

In 1940, a pair of KV-2 were sent to the battlefield on the Karelian isthmus. In spite of some rumors, KV-2s didn't take part in battles before the Great Patriotic War. The pair of KV-2 fired on already captured pillboxes. The results of those tests were excellent and later, in 1940, a KV-2 Heavy Tank was accepted for service. Soviet tankers often called those tanks as "Dreadnoughts".

During the production, the tank's turret was slightly improved and additional DT Machine-Gun was mounted in it. The shortened M-10 Howitzer was able to fire a 52-kg high-explosive projectile with muzzle velocity of 436 m/s. Please notice, only high-explosive shells with reduced propellant charge were used for KV-2's gun. The naval semi-AP round model 1915/28 was alloed to be fired of KV-2, but that round used only in Red Navies and was absent in Red Army's warehouses. Despite some modern "sources", the usage of armor-piercing and anti-concrete ammunition was prohibited - it was recorded in the KV-2's operational manual.



The abandoned KV-2. June 1941.

The KV-2 had 36 rounds for its main gun and 3087 rounds for its bow and rear machine-guns. The crew of six crewmembers: tank commander, gun commander, second gun commander (loader), gunner, driver, and radio operator.

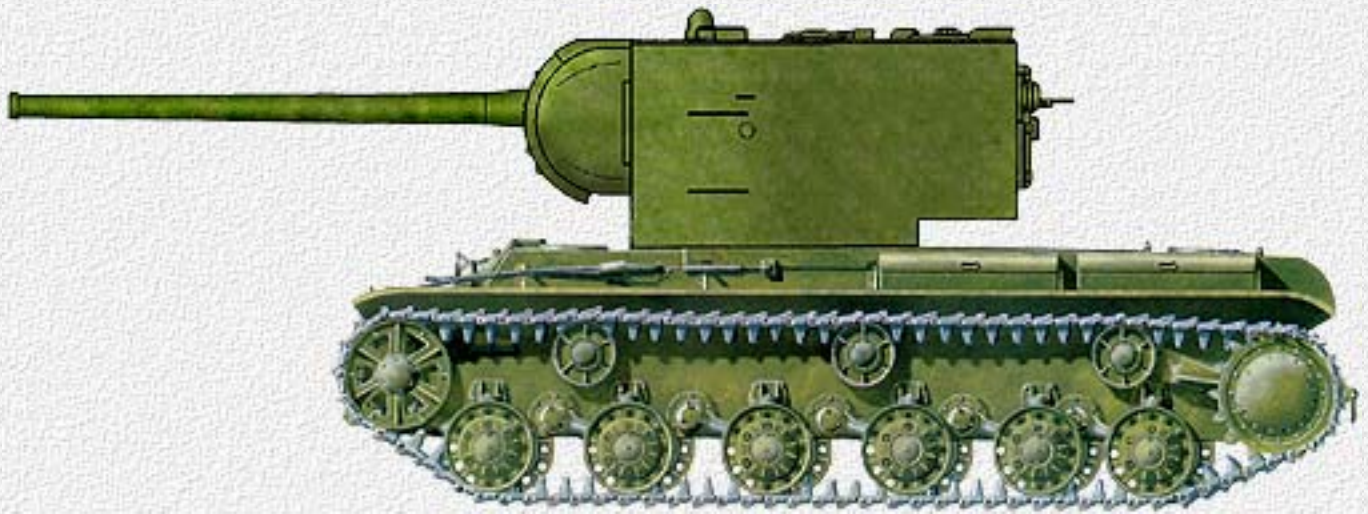
Besides of the 152-mm howtzer, there were some other guns which were either tested or intended to be mount on the KV-2. One of that was an attempt to mount a long

barreled 106.7 mm Gun ZIS-6 (initially, this gun was proposed for the perspective KV-3 and KV-5 tanks). From May to June of 1941, the KV-2 with the ZIS-6 was tested on factory's trials, after that it was sent to the ANIOP's trials which it failed. Main problem was with gun's ammunition: the gun had single-loading rounds. Such a lond and heavy shells were wery hard to handle and operate by a single loader.



Trials of the KV-2 armed with the 107 mm ZIS-6 Gun. May 19, 1941. (M.Kolomietz)

Additionally, the KV-2 armed with the 85 mm Gun F-39. Ordered by the NKO, in March 1941, the KV-2 with this gun was tested. Unfortunately, I was unable to find results of those tests.



The KV-2 heavy tank armed with the 85 mm F-39 Gun. (pic. V.Potapov)

Unfortunately, the new tank had same defects in transmission and chassis as the KV-1. Besides, most of KV-2 tanks didn't have a proper number of ammunition. Nevertheless, the appearance of KV-2 became a shock for German tankers. There wasn't any weapon, with the exception of the 88 mm AA-Gun, that could successfully defeat this beast.



The KV-2 Tank from the 2nd Tank Division delayed the 6th Panzer Division near the Rossienie town. Tank was immobilized by the German's 105 mm Howitzer but continued fighting. It was abandoned when run out of ammo.

fought off repeated attacks from the Russian 2nd Armored Division. Unfortunately, the Russian 52 ton heavy tanks showed that it was almost insensitive to hits from the 10.5-cm. Several hits from a 15-cm

Up north, the 6-Panzer-Division under Panzer-Gruppe 4 had encountered Russian heavy tanks. As related in the war diary of Panzer-Regiment 11 on 25 June 1941:

During the morning, the II.Abteilung/Panzer-Regiment 11 together with Kampfgruppe von Seckendorff advanced along the right-hand march route. Throughout the day both units

gun were ineffective and bounced off. However, continuous attacks by several Pz Kpfw IV managed to knock out a large number of tanks throughout the day, which allowed our own attack to again drive forward to about three kilometers west of Dubysa.

The bridgehead of Kampfgruppe Raus was held. During the afternoon, as a reserve, a reinforced company and the headquarters of Panzer-Abteilung 65 were pulled back along the left attack route to the crossroads northeast of Rossienie. In the meantime a Russian heavy tank had blocked the communications route to Kampfgruppe Raus, so that contact with Kampfgruppe Raus was broken for the entire afternoon and during the night. An 8.8-cm Flak battery was sent by the commander to fight this tank. It was just as unsuccessful as a 10.5-cm battery whose fire was directed by a forward observer. In addition, an attempt by a Pioneer assault troop using balled explosives failed. It was impossible to get close to the tank because of heavy machine gun fire.

The most of KV-2 tanks were lost because of breakdowns. For example, 41st Tank Division lost 22 KV-2 tanks of 33 tanks total. The only 5 tanks were destroyed by the enemy, other 17 tanks were abandoned because of breakdowns or run out of fuel. In October 1941, the KV-2's manufacture was cancelled. Totally 334 KV-2 tanks were produced.



REFERENCES:

[Specification of Soviet tanks](#)

[Specifications of Soviet tank guns](#)

Sources:

"The KV-2 tank. Operational manual", Voenizdat, 1941;

"M-Hobby" #5-6 1997

"Modelist-Constructor" #11 1984

V.Gagin "Heavy breakthrough tank Klim Voroshilov" Poligraph 1996

"Bronekolleksiya" #1 1998

T.Jentz "Panzer Truppen", vol. 1;

"Soviet heavy tanks in WWII", Tornado

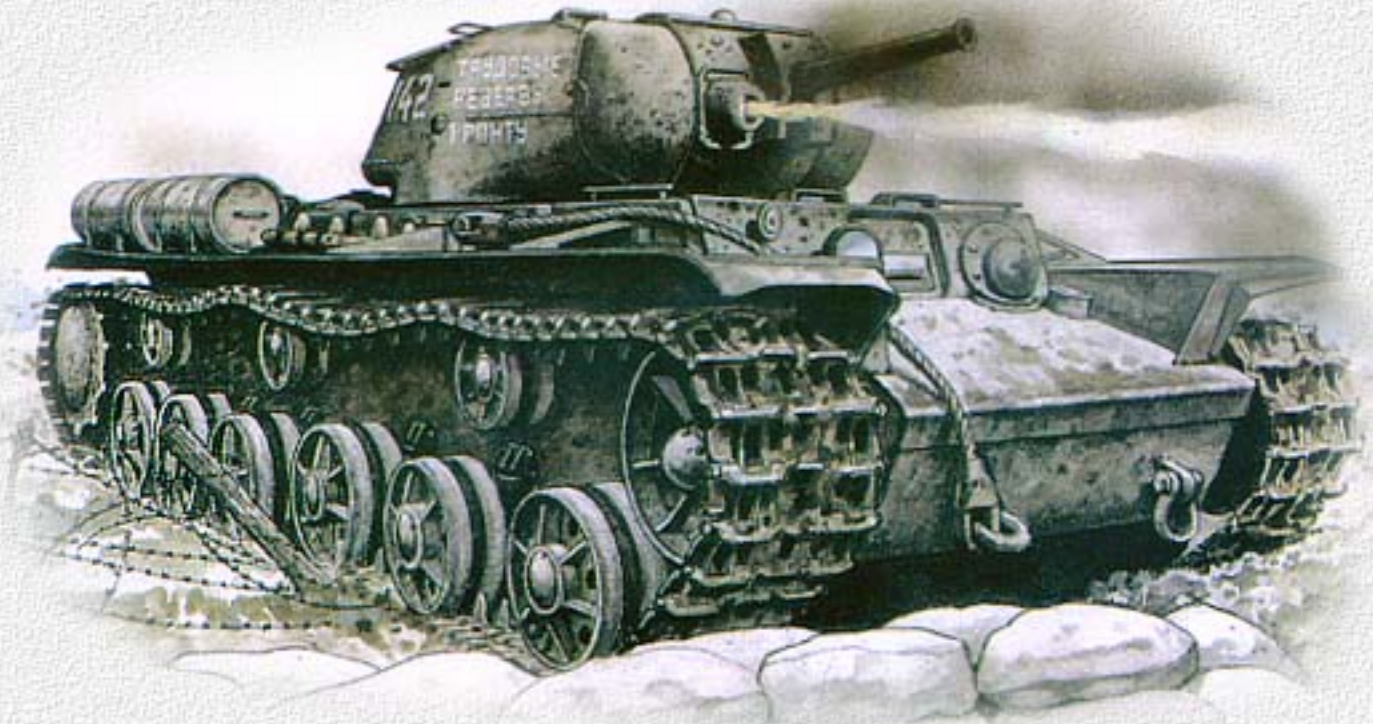
Cover picture - M.Dmitriev

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Heavy Flamethrower Tanks of the KV Series

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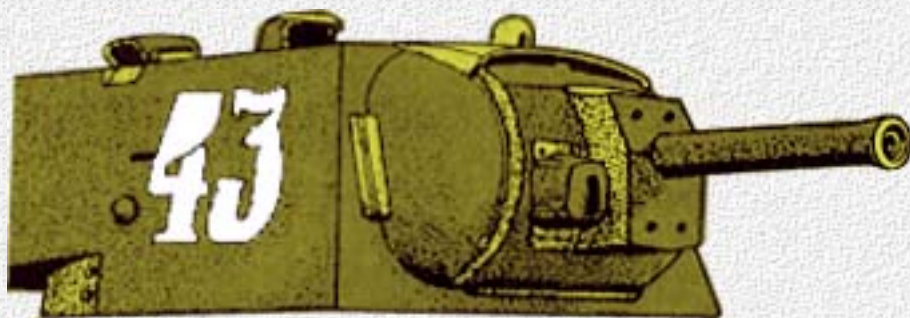
The KV-8S heavy flamethrower tank

The flamethrower tanks were intended for assaulting heavy entrenchments because of their great psychological effect. In November 1941, in Chelyabinsk, work on the KV-8 tank began. Under the Soviet pre-war tank theories, all flamethrower tanks were counted as a part of the Soviet Tank Army.



The KV-8 heavy flamethrower tank.

During this time, versions of the [T-26](#) light tank (OT-26, OT-130 and OT-133) were used as flamethrower tanks. However they were too weak and too light. The experience of the Winter War showed that flame tanks became the first targets for any anti-tank defense. That's why more powerful and better protected tanks were needed. So, Soviet



The reconstruction of the turret of the tank above

tank designers decided to re-equip [T-34-76](#) and [KV-1](#) tanks with flamethrowers.

The new ATO-41 flamethrower was mounted in the hull of the T-34 (in place of the bow TMG) and in the turret of the KV-1 (in place of the coaxial TMG).

Unfortunately, the KV's turret hadn't enough room to mount both the ATO-41 and the 76.2 mm gun, so this gun was replaced with a 45 mm gun mod. 1932. The thin barrel of this gun was camouflaged with a special gun jacket to simulate the common 76.2 mm gun.

The KV-8 had 92 rounds for the 45 mm gun and 107 shots for flamethrower with a total of 960 litres of gas mixture. In addition the tank had a bow DT TMG and a DT in the rear of the turret. Also, some tanks were equipped with a DT AAMG. Total ammunition for the machine-guns was 3400 rounds.

The ATO-41 could fire up to three times in every 10 seconds. Each shot took about 10 litres of gas mixture. The range of the flamethrower depended on the type of gas mixture:

- 65 litres with 60% mazut and 40% kerosene;
- 100 litres with kerosene-oil mixture.

The production of the KV-8 tank began in 1942. The main advantage of the KV-8 over the OT-34 was the capacity of gas mixture. The KV-8 and the OT-34 were organized in separate battalions of flamethrower tanks (The Chemical Tank Battalions).



The KV-8S heavy flamethrower tank.

Each battalion have had two KV-8 tank companies (10 tanks per battalion) and one OT-34 tank company (10 tanks plus one commander's OT-34). After production of the KV-1 was canceled, the KV-8 tank was based on the KV-1S. It was renamed as the KV-8S. The ammunition of the KV-8S was increased up to 114 rounds (for the 45 mm gun), 60 shots for the flamethrower and the gas mixture

capacity was decreased to 600 litres. During production, the ATO-41 flamethrower was replaced with the more modern ATO-42. The weight of the KV-8S was 43 tons. It had a crew of 5 men.

REFERENCES:

[Specification of Soviet tanks](#)

[Specifications of Soviet tank guns](#)

Sources:

"M-Hobby" #5-6 1997

V.Gagin "Heavy breakthrough tank Klim Virishilov" Poligraph 1996

"Soviet heavy tanks in WWII" Tornado

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The KV-85 Heavy Tank

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Development History

The KV-85 heavy tank was not an epochal machine in the history of Russian tank design and construction. Although it was not produced in the thousands, this tank still made a contribution to the victory over fascism.

The first attempts to arm a tank with a powerful 85-90 mm gun were undertaken before the war, in 1939. Development of these weapons was going on at the same time. Tests were conducted with production models of the T-28 and KV, but for a number of reasons were not conducted on the armament. Efforts of this nature were temporarily halted with the beginning of the Great Patriotic War.



The KV-1S tank, armed with the 85 mm gun S-31 in standard turret. This vehicle is currently preserved in the Museum at Kubinka (see photo below).

As early as December 1941, Uralmash Factory recommended the U-12 85 mm gun, developed by designers Sidorenko and Usenko, for arming of the KV tank. But the high cost of the gun was excessive for that time and it was recognized as not cost effective to accept it for the armament.



The KV-1S with the 85 mm gun. VIM BTVT at Kubinka. *(Photo by V.Potapov)*

In the spring of 1942 three design groups submitted proposals to the NKV with 85mm tank gun projects: TsAKB (chief-engineer V. Grabin), Kalinin OKB #8, and Factory #92 KB (KB means design bureau) of chief-engineer V. Savin.

All the design bureaus recommended utilization of the mounting and recoil

systems of the ZIS-5 or F-34 76 mm tank gun, but mounting in them of the 85mm barrel with the ballistics of the type-1939 anti-aircraft gun. For compensation of the recoil the TsAKB recommended increase of the recoil mass, OKB #8 -the employment of the muzzle brake of the anti-aircraft cannon, and Savin's design bureau -a redesigned muzzle brake.

All three variants were rejected because at that time, in the opinion of the technical

directorates of the NKV and the leadership of the NKTP, transition to an 85 mm gun was not justified because the per-round-fired cost of an 85 mm gun was significantly greater than that of a 76 mm gun.

However, in 1943, after the appearance on the battlefield of the new German Tiger and Panther tanks, and also the inadequate high explosive effects of the 76 mm gun against new field fortifications, interest in the 85 mm gun re-emerged with new strength.

Projects that had been suggested in 1941-1942 were reexamined, but the most promising of them -the Kalinin Factory #8 design -was rejected because it required use of a muzzle brake, which at that time was considered highly undesirable in a tank gun.



Standard KV-85 tank with the D-5 gun in enlarged IS tank turret. (M.Kolomietz)

In the winter of 1943, the TsAKB completed the design of a new tank and self-propelled gun cannon, the S-18, which was approved by the NKV technical directorate. Factory #9 was ordered to prepare two trial models in March 1943 (at that time the TsAKB did not have its own production facility). But the preparation of these guns was protracted. When they were finally subjected to testing it was revealed that the guns had been prepared with deviations from the blueprints. Factory #9 KB, under the leadership of F. Petrov, argued that the modifications were appropriate. V. Grabin argued for his original design. Nothing came of the disagreement. The test guns performed normally and rather than correct deficiencies that were uncovered during the tests, the designers and builders undertook liberally to pour dirt on each other. As a result, for testing of the first trial tank - "Object 237" -a non-working model of the S-18 gun was installed in its turret. After the deficiencies of the S-18 were exposed, it was not mounted on the tank but rather given over for prototypes of the [SU-85](#) (SU-85-1 and SU-85-4).



The KV-85 heavy tank. (M.Kolomietz)

Parallel with the development of the S-18, the TsAKB designed yet another variant of an 85 mm tank gun for the [KV-1S](#) and [IS tanks](#), which was designated as the S-31. For this reason this gun was being developed right away in two variants - with the ballistics of the 85 mm anti-aircraft gun (muzzle velocity of 790-800 m/sec) and with improved ballistics (muzzle velocity of 880-900 m/sec).

Factory #92 conducted the

preparation and testing of the gun, which showed that in comparison with the S-18 the new cannons were much more technological (simpler and cheaper in production). However, the gun with the improved ballistics demanded development of a new propellant in the existing casing. This complex task was not resolved in the time allotted (by 1 October 1943) and all remaining efforts on the 85 mm tank gun were limited to the ballistics of the 85 mm Anti-Aircraft Gun Model 1939.

Meanwhile, the Factory #9 design bureau reworked the design of the U-12 gun and in May 1943 recommended their own variant of the 85 mm tank gun. The new model received the designation D-5T and differed from the U-12 in that it had a semi-automatic camming-type mechanism borrowed from the ZIS-5 gun, along with several recoil and return components. The solid construction of the gun and the small length of its recoil permitted it to be mounted in the turret of any existing heavy tank without reworking of the turret. The S-31 had an advantage over the S-18 by having a small recoil length and reduced mass of breech components, but it had a greater number of small parts that required precise machining.

Four tanks (two IS and two KV-1S) armed with the 85 mm S-31 and D-5T guns were tested jointly. This test demonstrated the great operational superiority of the D-5T gun and it was accepted for armament.

For these tests the S-31 gun was mounted in the standard KV-1S turret with minimal reworking. The crew had been reduced to four men. This tank (Object 231, serial number 30751-51) is now preserved at the VIM BTVT at Kubinka.

Despite the success with the KV, work on a new future IS-85 tank was dragged out at the

same time that the front was demanding new tanks with powerful armaments. It was necessary to withstand for several months before the introduction of the IS-85. A way out was found. The design bureau of J. Y. Kotin decided to come up with a modernisation of the KV-1S tank, mounting on it the turret of the IS-85 tank with the D-5T gun.



The KV-85 heavy tank on pedestal at Avtovo. This is the sole production vehicle of this type preserved to this time. During restoration of this vehicle the hull machinegun was mounted incorrectly. (Photo by A.Osipov)

The following work was accomplished during the mounting of the new turret on the KV-1S: the under-turret box, in which the enlarged-diameter ring of the improved tank turret fit with difficulty, was widened. The basic load of 70 main gun rounds was stored in improved racks. With the placing of the gun and the ammunition racks, the designers had to delete the fifth crewmember -the gunner-radio operator, for whom there was no

longer any space. The hull-mounted DT machine-gun, which previously was carried in a movable ball mounting, was now fixed. The power pack, transmission, and suspension components were taken straight from the KV-1S.

The first KV-85s were re-worked from excess KV-1S hulls, welding up the hole for the ball-mounted hull machine gun. The incorrect opinion has appeared in Western literature that there was a "second version" of the KV-85 with a flexible front machine gun. This confusion most likely arose as a result of study by Western experts of the only KV-85 tank that has been preserved to this day (monument in Avtovo, St.Peterburg), where a mistake was made in the restoration process. According to archival data, 148 KV-85 tanks were produced; they were sent to the front beginning in September 1943. Simultaneously, output of the KV-1S tank was continued until December 1943.

Factory #9 was given an order for production of the D-5T, but it turned out to be rather difficult for the factory. The factory was completely incapable of simultaneous production of guns for the IS-85 and KV-85 and for the T-34-85. Factories #8 and #13 were dedicated to mass production of the D-5T. These problems with production of the gun prevented the KV-85 from becoming a mass tank. By the spring of 1944 the IS-2 entered mass production with incomparably greater armament and armor, and the subsequent

fate of the KV-85 (and also the IS-85) was sealed.

KV-85 in Action

A great portion of the KV-85s in the guards tank breakthrough regiments ended up on the Southern Front (2nd formation), later the 4th Ukrainian Front, where they participated in the liberation of Ukraine and the Crimea. Because on the whole our tank was not superior to the German heavy tanks, battles were fought with varied success. The results depended primarily on the training of the crews of the opposing sides and on the tactics they selected for the engagement.

The 34th Guards Heavy Tank Breakthrough Regiment (TTPP) (total 20 KV-85 tanks), which together with the 40th Heavy Self-Propelled Artillery Regiment (TSAP) (total 9 [SU-152s](#)), fought in the area of the village Ekaterinovka on 20-25 November 1943 as element of the 28th Army of the 4th Ukrainian Front.



The KV-85 heavy tank damaged in the Melitopol area, November 1943. *(Bundesarchiv)*

On 20 November both regiments in a two-echelon formation attacked enemy positions that in addition to artillery had Pz.Kpfw IV Ausf.H and Marder II self-propelled guns (up to 18) dug into their positions. In the course of the day the tankers and self-propelled artillerymen managed to capture the first lines of the German trenches, losing 6 KV-85 tanks (left in enemy-controlled zone) and 6 SU-152 guns in the process. On the second

day of the battle up to 10 Pz.Kpfw IV Ausf. H undertook a counterattack on the positions of Soviet troops. The attack was beaten off by the efforts of the infantry and both tank regiments, costing the enemy five tanks without any losses on Soviet side. On 23 November all serviceable vehicles in the regiment again attacked the German positions, broke through their defenses, and advanced 5 kilometers in deep. An additional two KV-85 tanks were lost in this operation (one of them burned up). The 34th Guards TTPP was sent to the rear for repair on 23 November and only the 40th TSAP continued to fight until 28 November, losing one or two vehicles daily in combat.

Along with the 19th Tank Corps, the 1452d Separate Self-Propelled Artillery Regiment (SAP), which was equipped with 11 KV-85s, 5 KV-1S's, 6 SU-152s, and also 3 [SU-76s](#), participated in the liberation of the Crimea. It seems that because of a severe shortage of self-propelled guns, someone decided to equip the SAP with KV tanks, which had the most destructive armament of all the tanks presented in the Crimea at that time. The 19th Tank Corps had only the [T-34-76s](#) and light tanks, and the enemy had two brigades of assault guns: the 191st and 279th under the command of Major Mueller and Captain Hoppe (altogether the XVII German Army had 215 tanks and self-propelled guns, primarily the StuG III with 75 mm cannons). But for a number of reasons associated with the leadership of the operations, the regiment fought with the masterfully retreating German infantry, who broadly employed mines.



Operational group of 1452nd Heavy Self-Propelled Artillery Regiment, attached to the 512th Independent Tank Battalion, on the street of liberated Evpatoria. April 1944. (MOS)

On 8 April 1944, in accordance with the order of the commander of the 3rd Guards Rifle Division, to which the regiment (11 KV-85, 5 KV-1S, 2 SU-152) was operationally subordinated, the tankers and infantry, who had concentrated 1.6 km south of Turetskiy wall, attacked the enemy positions from the west to capture the town Armyansk. Several minutes after the launching of the attack the regiment blundered into a minefield

that was unknown for the Russians and therefore not marked on the map. Sappers designated for mine clearing were on the tanks and could not dismount because the Germans opened up on them with all types of weapons. Paradoxically, three hours after the launching of the attack, the 1452nd SAP still managed to break through the enemy

defenses, losing 1 burned-out KV-85, 3 KV-85s blown up by mines, and 5 KV-1S's, 4 KV-85s, and 2 SU-152s damaged by enemy gunfire. No personnel were killed, but 2 officers and 4 soldiers were wounded. The 3 remaining operational KV-85s and 5 KV-1S's with an assault force from 3rd Guards Rifle Division reached the town Armyansk at 14:00 on 8 April. The regiment had accomplished its assigned mission. As a result of this battle, 11 pillboxes, 5 antitank guns, and up to 200 enemy soldiers and officers were destroyed. Thus, the basic losses in personnel and equipment were caused by insufficiently competent leadership, which was unable to organize coordination of various branches of troops during the breakthrough of the German defense.

The regiment repaired its equipment until 10 April 1944 and on 11 April a tank group (3 KV-85s 2 SU-152s, 2 SU-76s) of 1452nd SAP again attacked the German defenses in the area of Ishun. Tanks supported the infantry of the 3rd Guards Rifle Division. Because reconnaissance was not conducted, the tanks rolled into an 8-meter antitank ditch and special tank traps that were similar to ditches. The attack failed. A pair of KV-85s and SU-76s was recovered from the ditches with the aid of tractors. After this grievous experience of the use of heavy tanks, the command of 2nd Guards Army decided to make a radical change in the tactics of the employment of this unit. The more so because on 10-11 April the Germans began to organize the withdrawal of their forces toward Sevastopol. On order of the commander of 2nd Guards Army (#005/OP of 10 April 1944), the vehicles of 1452nd SAP and 512th Independent Flamethrower Tank Battalion (OOTB) were parceled out to army mobile detachments. These detachments consisted of infantry on Studebaker trucks and also tanks and self-propelled guns, and had the mission as rapidly as possible to break through to Sevastopol. KV-85 tanks also were assigned to these detachments.

Engagements with the StuG III were exceedingly few -the Germans were retreating under the cover of artillery and mine fields. A group under the command of Hero of the Soviet Union Guards Colonel Puzanov (1 T-34, 8 TO-34s, 4 KV-85s) liberated the towns Evpatoria, Saki, and Bakhchisaray. On 6 May 1944, once again formed into a unit, 1452nd SAP, now comprising only 1 KV-85 and 2 SU-152s, reached Sevastopol and fought in the area of Mekenziev Hills, supporting the 37th Guards Rifle Division. On 9 May the two serviceable vehicles of the regiment, a KV-85 and an SU-152, broke into Sevastopol with the 264th Guards Rifle Regiment.



The KV-85 heavy tank.

The KV-85 rarely engaged enemy tanks and SP-guns during the liberation of the Crimea, and was employed primarily as a self-propelled gun for support of infantry.

The employment of the KV-85 against the German heavy tanks Pz. Kpfw VI Ausf. H occurred in the zone of combat actions of 38th Army, 4th Ukrainian Front, on 28 January 1944. During this battle Soviet tankers acted decisively and skillfully, not harboring any unfounded illusions regarding the training of the German tankers and the quality of their combat vehicles. An operations summary concerning the combat actions of armored and mechanised forces of 38th Army from 24 to 31 January 1944 to the 7th Independent Guards Heavy Tank Regiment (7th OGTTP) speaks to this. This regiment was covering the withdrawal of units of the 17th Rifle Corps, which had fallen into semi-encirclement as a result of a German counteroffensive.

"In accordance with a combat order of headquarters, 17th Corps, the remaining 5 tanks and SP-guns (3 KV-85s and 2 SU-152s) by 07:00 28.01.44 occupied all around defense at Telman sovkhos (collective farm) and were prepared to fend off enemy tank attacks toward Rososh, Kommunar sovkhos, and Bolshevik sovkhos. Some 50 infantrymen and 2 antitank guns were set up in the defense around the tanks. An accumulation of enemy tanks had been spotted south of Rososh. At 11:30 the enemy launched an attack

from the south on Telman sovkhos in the direction of Rososh with up to 15 T-6 tanks and 13 medium and light tanks.

Occupying favorable positions, because of the cover provided by their fortifications and haystacks, and having permitted the enemy tanks to approach to battlesight range, our tanks and SP-guns opened fire and broke up the enemy combat formations, destroying 6 tanks (of these, 3 Tigers) and up to a platoon of infantry. The KV-85 of Senior Lieutenant Kuleshov was designated to liquidate the German infantry that penetrated our position. He fulfilled this assignment with fire and his tracks. By 13:00 of the same day the German troops had decided not to attack the Soviet position frontally, bypassed Telman sovkhos, and surrounded the Soviet grouping.

The battle of our tanks in encirclement by superior enemy forces was characterized by the extreme skill and heroism of our tankers. A tank group (3 KV-85s and 2 [SU-122s](#)) under the command of company commander Guards Sr. Lieutenant Podust, defending Telman sovkhos, simultaneously prevented the German forces from being shifted to other areas of battle. His tanks frequently changed firing positions and conducted well aimed fire at German tanks. The SU-122s, exposing themselves, fired at infantrymen riding in transporters and moving along the road to Ilintsa, which limited the freedom of maneuver of German tanks and infantry and, in the main, made possible the escape from encirclement of units of the 17th Rifle Corps. The tanks continued to fight in encirclement until 1930, although there were no longer any infantrymen in the sovkhos. Maneuver and intensive fire, and as well the use of cover for conducting fire permitted them to suffer almost no

losses (only 2 wounded), while inflicting significant personnel and equipment losses on the enemy. Through 28.01.44 the Germans lost (both damaged and destroyed) 5 Tiger tanks, 5 T-4 tanks, 2 T-3 tanks, 7 armored transporters, 6 antitank guns, 4 machine-gun positions, 28 wagons with horses, and up to 3 platoons of infantry.

At 20:00 the tank group broke out of encirclement and by 22:00, after a firefight, reached the position of Soviet troops, having lost 1 SU-122 (burned up)".

Countless examples of the employment of the KV-85 tank demonstrated that the 85 mm gun was an effective weapon against German heavy tanks (Panther and Tiger) and should have been mounted on the T-34 medium tank, which in fact it was, later. Even before the operation for the liberation of the Crimea, commanders of mobile pursuit detachments complained of the fact that the KV-85 and SU-152 were not fast enough and fell behind their infantry-carrying trucks. It was understandable, given that the KV-85 was a heavy tank. However its low maneuverability and speed was compensated for by its powerful armor and armament. And if the survivability of the KV was considered at that time to be sufficient, then the gun required significantly more power so that it could defeat German equipment at maximum ranges.

In accordance with the results of the combat actions of the KV-85, the designers and military decision makers concluded that subsequent modernisation of the KV tank family was not appropriate. While the 85 mm gun was adequate to defeat German tanks, it lagged behind German tanks in its armor-penetrating capability when fired at long ranges. Soviet heavy tanks were weaker in armor than their German counterparts. Consequently, the concept of medium and heavy tanks (T-34 and KV) armed with a cannon of a single caliber was outdated. It was necessary to have a heavy tank with a powerful gun that was superior to the German 88 mm gun in all basic parameters.

These conclusions were considered during the creation of the IS-2 tank with its 122 mm gun and during the expansion of the production of the 85 mm cannon for the [T-34-85](#).

As concerns the KV-85, in view of their small quantity in production and intensive employment, only isolated tanks of this modification remained in the forces by the middle of 1944.

At the present time two KV tanks with the 85 mm gun have been preserved. One of them is the KV-85 mounted as a memorial in the area of Avtovo in St.Peterburg. The other is a

production KV-1S armed with the 85 mm Tank Cannon S-31 in standard turret located in the Museum of Armored Vehicles at Kubinka, near Moscow.

Experimental Vehicles



The KV-122 experimental heavy tank.



The KV-152 experimental heavy tank.

Attempting to increase still greater the firepower of the KV tanks, and also for development of new artillery systems on a "live" tank chassis, it was suggested to mount the 100 mm Gun S-34 in the turret of a KV-85. The new vehicle was designated the KV-100. After testing, the turret of an IS-2 tank with the 122 mm Gun D-25 was mounted on the KV-85 chassis. Although no principal problems resulted from this reworking, the design was rejected because the IS-2 had already been placed in mass production.

In 1943, carrying out a personal order of I. V. Stalin, the artillery design bureau attempted to give a second life to the [KV-2](#) heavy assault tank,

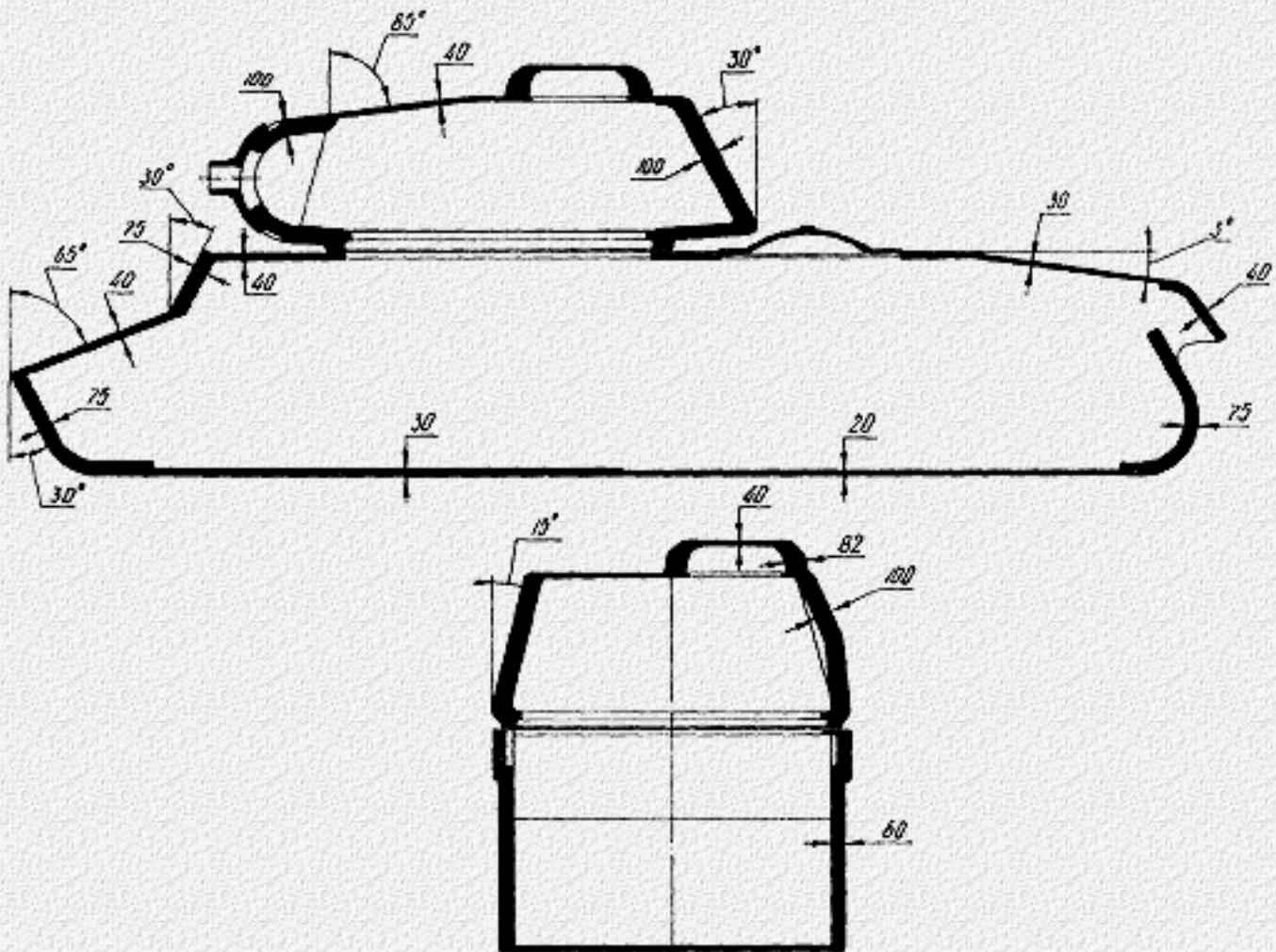
as very necessary for the destruction of enemy defenses. The primary problem in this regard was the fact that it was necessary to mount the 152 mm howitzer in a standard turret of the KV-1S. The TsAKB and OKB #9 were engaged in secret competition for the development of this artillery system. Both collectives drew the conclusion regarding the principal necessity of using a high-efficiency muzzle brake in the construction of their gun. OKB #9 already had a recommendation for adopting the 152 mm Field Howitzer D-

1 as standard. Therefore, during the creation of a tank variant, its recoil components were carried over to the carriage of the D-5T tank gun. Thus far no significant proof has been found that the D-1-5 (or D-15) howitzer was mounted even on a single KV, but an SP-gun on the T-34 chassis with armament from the "152 mm Tank Cannon D-1-5" had been considered for some time as a future variant to replace the SU-122.

The TsAKB took a slightly different path. Here they preserved the designs of the ZIS-5 and S-31 guns, but somewhat strengthened them. Production proceeded without problems and a KV with an S-41 152 mm howitzer was demonstrated to Marshal Voroshilov during his visit to the TsAKB in August 1943. Unfortunately, no additional details are known about this vehicle.

In view of their futility, all experiments with 152 mm howitzers in tank turrets were halted by order of the NKV in October 1943. The SU-152 already was slated for fielding and work was being conducted on the creation of the IS-122 (IS-2).

The Armor Protection of the KV-85



REFERENCES:

[Specification of the Soviet tank guns](#)

[Specification of Soviet tanks](#)

[The blueprint of the production KV-85](#)

Translated by:

[James F. Gebhardt](#)

Sources:

"M-Hobby", #1, 2000

I.V.Pavlov M.V.Pavlov "Sovetskie Tanki i SAU 1939-1945", Moscow 1996

M.Svirin "Artillerijskoye Vooruzhenie Sovetskikh Tankov 1940-1945", Armada Vertikal #4

"KV - Sovetskij Tyazhelij Tank", Tornado, Riga 2000.

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Heavy Tanks of the JS Series

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Note: All Russian terms and abbreviations shown as *red italic* are described in the [Glossary](#).

Development History of the JS-1/JS-2



Heavily Armoured KV-13 Medium Tank.

The predecessors of the JS-1 and JS-2 tanks were the [KV-1 Heavy Tank](#) and Heavily Armoured KV-13 Medium Tank (see photo to the left). The KV-13 (and its subsequent version - Object #233) became the first major independent project of the Experimental Tank Factory, created in March 1942 in Chelyabinsk from Design Bureau #2. N.V.Tseits, who had been recently released from a *GULag*, was appointed head designer of the project.

Other members of the design team were K.I.Kuzmin (hull), N.M.Sinev (turret), S.V.Mitskevich (chassis) and G.N.Moskvin

(general assembly). The KV-13 was designed as a universal tank - medium tank weight and heavy tank protection. This project was distinguished by its extensive use of cast armour. Casting was used not only for the turret, but also for the main elements of its hull - the glacis, turret ring and rear.

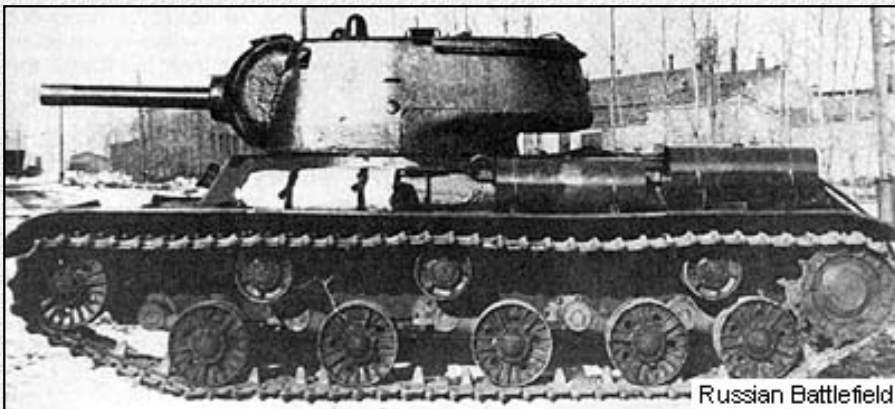
This reduced the usable internal space, but increased the effective armour protection whilst reducing the amount of armour needed for its manufacture. The last point was especially important in light of the State Defense Committee's decree of 1942 to minimise the consumption of armour materials.

The first test unit was designed and produced in an extremely short period of time and in May of 1942 it was delivered to the factory testing facilities. The tank weighed 31.7 tonnes and was armed with a 76.2 mm ZiS-5 gun and a coaxial DT TMG.



JS tanks: "Vehicle #2" (left) and "Vehicle #1" after trials in April 1943.

The maximum front armour thickness of its hull was 120 mm, that of its turret - 85 mm. Its V-2K 600 h.p. engine allowed it to reach speeds of up to 55 km/h. Elements of the [T-34's](#) chassis, including tracks, were used, whilst the road wheels were taken from the KV.



JS-2 tank "Vehicle #2" (Object 234) inside the ChKZ Factory, Spring 1943.

The KV-13 had an improved (U-shaped) radiator similar to the one previously used on the Kirov Factory variant of the [T-50](#) tank. This allowed for a more efficient engine block configuration and also increased the efficiency of its air intake.

Several flaws surfaced during the testing of the first experimental unit of the KV-13: poor acceleration due to transmission problems, tracks and rollers easily damaged, tracks being thrown while making turns, etc. In July 1942, in the

middle of its testing, the head designer N.V.Tseits died and N.F.Shamshurin was appointed in his place. On his initiative the KV-13 received the transmission developed by F.A.Marishkin for the [KV-1S](#), as well as some other parts of its chassis. However, even after these improvements, the tank did not pass its tests and the military quickly lost interest in it.

Despite these early failures, in December of 1942 the assembly of two new variants of the KV-13 began at the Experimental Tank Factory. The new vehicles shared only the hull, torsion bar suspension, and chassis from the first version. The turrets and many other elements were completely new designs. The

transmission used was significant in its use of a planetary 2-step traversing gear designed by A.I. Blagonravov. The cooling system was improved, while the track links were lightened by making every other link flat (the so-called "Chelyabinsk tracks").



The experimental JS tank "Vehicle #3" (Object 237) armed with the S-18 Main Gun, after trials in Summer 1943.



The experimental JS tank with the 85 mm Main Gun S-31 during Government trials.

The appearance of the German heavy Tigers on the Eastern Front played a direct and decisive role in increasing the speed of development of these new models.

According to decree #2943ss of the **GOKO** (February 24, 1943) the Kirov factory in Chelyabinsk and factory #100 (the new name of the Experimental Tank Factory) of **NKTP** were to manufacture two experimental tanks of the "Josef Stalin" (JS) class (based on the two latest models of the KV-13) and prepare them for testing.

The model armed with a 76.2 mm gun was designated JS-1 (also retaining its factory designation: "Object #233"). The second model, armed with a 122 mm U-11 tank howitzer (designed for the experimental heavy tank KV-9) was designated JS-2 (Object #234).



The experimental JS with the 85 mm gun S-31 during Government trials.

recommended increasing the number of road wheels on future test units of JS tanks.

Both models were tested between March 22 and April 19, 1943 and in general performed quite well. The state commission noted that both JS tanks weighed less than the KV-1S, could achieve higher speeds, had better armour protection and had equal (JS-1) or better (JS-2) armament.

During testing, serious defects were discovered, particularly with the chassis and engine/transmission. It was also noted that when moving over soft ground the tanks experienced high rolling resistance due to their treads flexing into the space between the road wheels. The commission

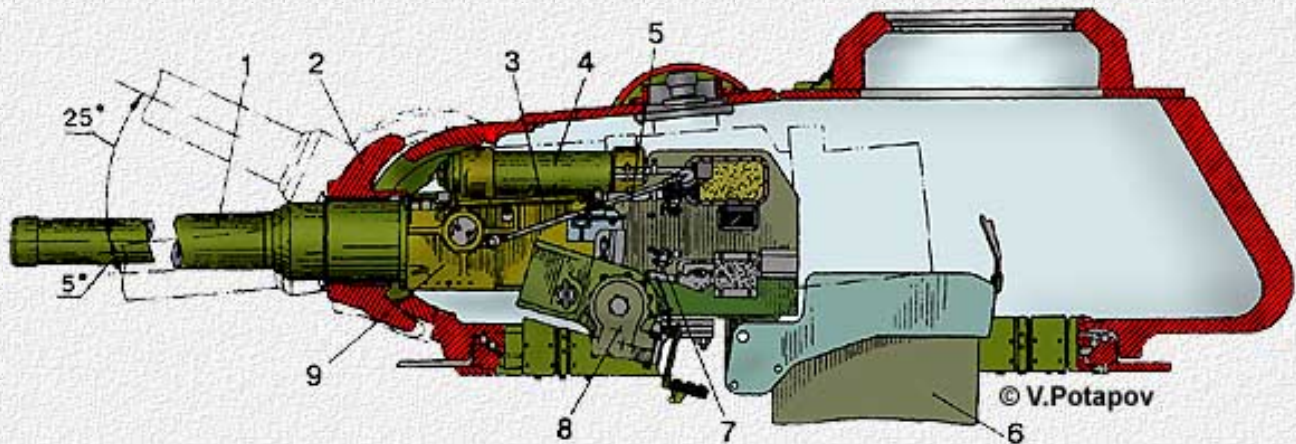
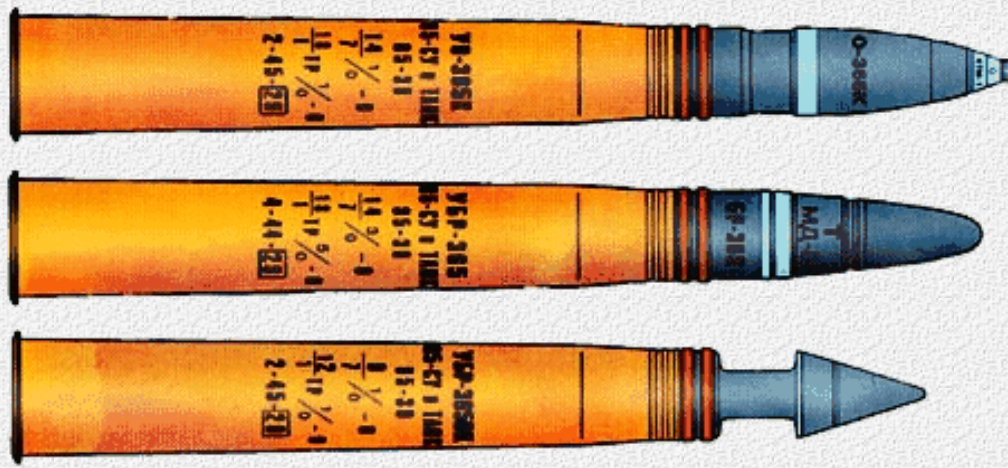


FIGURE 1. Cross-section of the JS-1 heavy tank turret with the 85 mm D-5T Main Gun.

1. The barrel;
2. The mantlet;
3. The telescopic sight 10T-5;
4. The recoil brake;
5. The driving gear of the periscopic sight PT4-15;

6. The bag for cartridge-cases;
7. The elevation level;
8. The lifting mechanism;
9. The gun-cradle

FIGURE 2. Ammunition used for the JS-1.



- the UO-365 fragmentation shell;
- the UBR-365 armor-piercing shell;
- the UBR-365P armor-piercing sub-calibre shell.



A captured Tiger on Soviet trials. "Armour 82 mm" is written on the side of the tank.

At the same time preparations for production of the new vehicles began at the Chelyabinsk Kirov Factory (ChKZ), Factory #100 and their main partner factories- the Ural Factory of Heavy Machinery (UZTM) and Factory #200. However, further developments forced major changes in these preparations. In early April, the first reliable data on the armour protection of the Tigers was obtained. On April 15, 1943, the **GKO** issued the decree #3187ss instructing the People's Commissariat for Armaments to develop more powerful anti-tank guns capable of destroying the new enemy AFV's.

At the end of April, a captured Tiger was brought to the Kubinka testing grounds to be subjected to firing tests. It turned out that the most effective weapon against it was the 85mm AA-gun 52-K model 1939, which penetrated the Tiger's 100 mm frontal armour from 1000 metres.

The **GKO's** decree #3289ss of May 5, 1943, instructed the Design Bureaus to aim for the performance characteristics of that gun. Following this decree the Central Artillery Design Bureau (**TsAKB**), under V. G. Grabin, and the Design Bureau of Factory #9, under F. F. Petrov, were entrusted with developing and installing new 85-mm guns on two KV-1S and two experimental JS tanks.



Government trials of the JS-85 during the Autumn of 1943.

In the first half of June, four guns (two S-31s of the **TsAKB** and two D-5Ts of Factory #9) were ready. The S-31 was the result of mating the 85mm barrel with the base of the 76.2mm ZiS-5 tank gun, which greatly simplified its manufacture. As for the D-5T, it was a variant of the D-5S gun developed for the **SU-85** self-propelled gun and was characterised by its low weight and light recoil.

Right from the start it was obvious that it would be impossible to install an 85 mm gun in an unmodified JS turret without greatly degrading the crew's working space. It was therefore decided to increase

the turret's dimensions, increasing the size of the crew compartment, which required the lengthening of the tank's hull by 420 mm.

An extra road wheel was added to compensate for the increased distance between the second and third road wheels. The new turret was cast at Factory #200. All these changes resulted in an increase of the tank's weight to 44 tons and a reduction in its mobility. Such was the price of a more powerful gun. The JS with an 85mm gun was designated "Object #237". In the beginning of July 1943 two experimental vehicles - one with an S-31 gun and one with a D5-T gun - were produced.



Government trials of the JS-85 during the Autumn of 1943.

At the same time the **ChKZ** prepared two designs for the installation of the 85mm gun on a KV-1S. The first variant - "Object #238" - was a production KV-1S with a S-31 gun in its unmodified turret. The second - "Object #239"- received the turret from "Object #237" with a D-5T gun.

In July 1943, all four tanks underwent comparative test. Based on the results of these tests, the D-5T gun, Object #237, and Object #239 gave the best results and were accepted for service, whilst "Object #238" was cancelled due to the extremely small crew compartment hindering the normal functioning of the crew. Meantime

both Object #237, and Object #239 were renamed as JS-85 and KV-85 respectively.

On July 31 the KV-85 and JS-85 were delivered to the Kubinka proving grounds for tests, accompanied by twenty eight engineers led by the chief engineer of Factory #100, Mr. N.M.Sineev. The tests were started on August 2 by the Commission under the head of the Technical Administration of the Red Army, Major-General S.A.Afonin. The artillery tests were performed at the Gorokhovetsky Proving Ground. Based on the results, the Commission recommended both tanks for production. On the 8th of August, a column of experimental AFVs passed through the streets of Moscow into the Kremlin. Here, they were examined by Stalin, Molotov, Voroshilov, Beria and others. Interestingly, for the purpose of this display, all the crew

except the drivers were replaced by **NKVD** officers.



The production JS-85 inside the **ChKZ**. August 1943.



The JS-6 suspension was trialed on the JS-85 (Object 244), which was overloaded.

On the 4th of September 1943, the JS-85 heavy tank entered service with the Red Army as ordered by GKO decree #4043ss. The same decree ordered Factory #100 (in cooperation with the Technical Administration of the Red Army) to develop, manufacture and test an JS tank armed with a 122mm gun by October 15, 1943, as well as a self-propelled gun on the same chassis ([JSU-152](#)) by November 1, 1943.

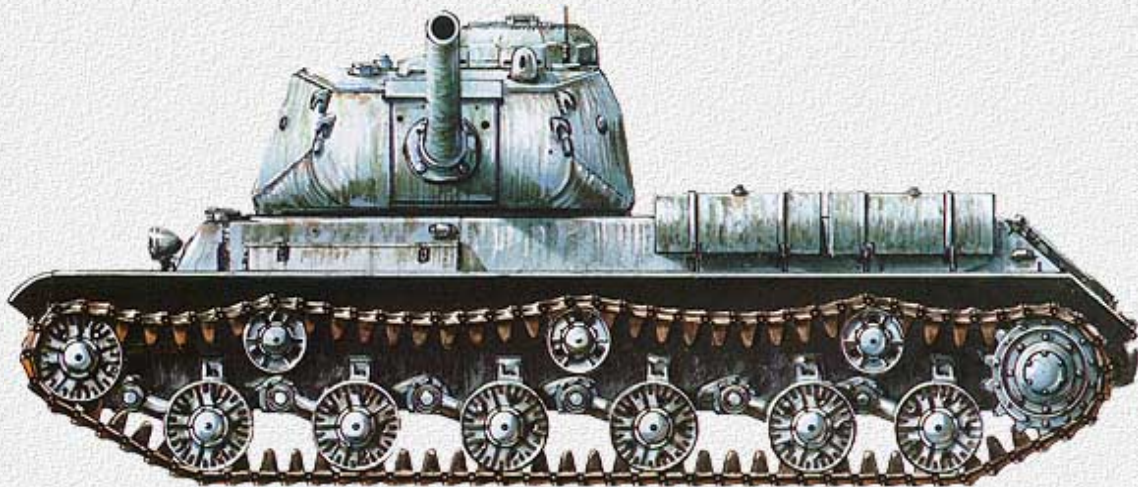
The first person to suggest arming the JS tank with a gun larger than 85 mm was the Director and Chief Designer of Factory #100, Zh.Y.Kotin. He realized in August 1943, after studying the results of the Kursk

battle, that the most effective anti-tank weapon employed against German Tigers was the Corps 122 mm Field Cannon A-19 Model 1931.

The designers at Factory #9 came to the same conclusions as Mr. Kotin, and designed the D-2 Heavy Anti-Tank Cannon by marrying the A-19 barrel with the carriage of the Divisional 122 mm Howitzer M-30.

This powerful weapon was ordinarily employed against heavy tanks as an anti tank gun. The barrel of the gun was built into the gun carriage of the M-30 and the resulting gun successfully passed its tests, it became possible to install the A-19 gun in a heavy tank by using recoil-absorbers, elevation mechanism,

and other mechanisms from the Experimental 122 mm Tank Howitzer U-11. This was done in a similar fashion to the 85mm guns D-5T and D-5S, but it was also necessary to add a muzzle brake.



The JS-1 heavy tank. 1st Guards Heavy Breakthrough Tank Regiment, 11th Guards Tank Corps. Ukraine during March 1944.

Having received the necessary design papers from Factory #100, the Design Bureau of Factory #9 promptly prepared a draft design for the A-19 gun in the JS-85 turret and sent it to Moscow with J.Kotin. The People's Commissar for Tank Industry V.A.Malyshev (A People's Commissar is like a Minister) liked the project and Stalin approved it. The JS tank with a 122 mm gun entered service with the Red Army on the release of **GKO** decree #4479ss dated October 31, 1943. This decree also charged Factory #9 with manufacturing a tank variant of the A-19 gun with a piston-type breech by November 11, 1943 (to be delivered for firing tests by November 27). At the same time the factory was ordered to start manufacturing this gun with a wedge-type breech in 1944. It was also decided to allow production of several 100 mm guns for testing on JS tanks.



The pre-production JS-122 Heavy Tank (Object 240) armed with the D-25T Main Gun seen at the ChKZ in Autumn 1943.



Experimental JS-122 tank (Object 240) armed with D-25T seen at the ChKZ in Autumn 1943.

The first example of the A-19 tank gun was ready on November 12, 1943 - the barrel of the D-2 gun was removed from the M-30 gun carriage and installed in the D-5T base after after reducing its diameter. The T-shaped muzzle brake design was borrowed from the D-2 gun. The unusual muzzle brake was intended to reduce the main disadvantage of any muzzle brake: when a shot is fired, a large cloud of dust is kicked up from the ground, revealing the position of the tank. The T-shaped muzzle brake was intended to minimise any dust plumes due to firing.

The JS-122 (Object #240) passed the Government tests quickly and successfully. Thereafter, the tank was moved to one of the Moscow military testing grounds where it was demonstrated to K.E.Voroshilov. The tank's 122 mm gun was fired from 1500 metres at a captured German Panther tank.

The round hit the side of the Panther's turret, penetrating it cleanly and tearing the opposite side out at the welded seams, throwing it back a few metres. During these tests the muzzle brake of the A-19 blew up almost killing Voroshilov. After this accident it was decided to change the muzzle brake to a 2-chamber design similar to that used by the Germans.

FIGURE 3. Different muzzle brakes used for the D-25T Main Gun.



T-shaped



Of the "German type"



Of the TsAKB construction



Trials of the JS-2 tank with the "German type" muzzle brake and the minerolling device PT-3 during 1944.

The first part of production JS-1 tanks was delivered in October of 1943, and the JS-2 - in December. At the same time **ChKZ** continued to manufacture KV-85 tanks until the end of 1943.

In January of 1944 the last 40 JS-85s were manufactured at the **ChKZ**. After this, it produced only the JS-122. These mounted the new 122 mm Tank Cannon D-25T with a wedge-shaped semi-automatic breech, which allowed an increased rate of fire from 1-1.5 shots per minute to 1.5-2 shots per minute. In March 1944, the "German-type" muzzle brake was replaced with a better design from the **TsAKB**. At the same time, the JS-85 was renamed JS-1, and the JS-

122 was renamed JS-2.

At this stage, the issue of the JS-2's armament was not completely resolved. The military was not satisfied with its low rate of fire and limited ammunition stowage - only 28 two-piece rounds (compared to the 59 one-piece rounds for the JS-1 and 114 one-piece rounds for the KV-1S).



JS-2 with a plough trench digger.

FIGURE 4. Ammunition for the D-25 Main Gun



- the armor-piercing BR-471 projectile and its charge (left pair);
- the high-explosive fragmentation OF-471N Projectile and its charge.

ricocheted off the front armour of a Panther leaving huge holes and cracks in it.

This was explained by an interesting change of circumstances in the Summer of 1944. The Germans experienced a shortage of manganese and had to switch to using high-carbon steel alloyed with nickel, which made armour very brittle, especially at the seam welds. The first encounters of JS-2 tanks with the

Further, after the first encounters between the JS-2 and German heavy tanks, it turned out that the sharp-nosed 122 mm APHE round - the BR-471 - could only penetrate the frontal armour of a Panther up to 600-700 metres. The less powerful frontal armour of a Tiger could be penetrated at distances up to 1200 metres. However, at such distances only very well trained and experienced gunners could score a hit. The vertical armour of a Tiger I, although thicker than that of a Panther, was more easily defeated by the sharp-nosed projectile of the JS-2 Main Gun, whilst it often ricocheted off the sloped armour of a Panther. Later, Soviet designers noticed the blunt-nosed projectiles worked fine against sloped armour. After several tests, designers revealed the effect of "normalisation" ([Read more about "normalization" effect here](#)). The powerful HE round, OF-471, when fired at German tanks, caused cracking and could even completely tear off the front armour plate at the seam weld. The first results of the JS-2 in combat (backed by the results of its tests at the Kubinka testing grounds in January of 1944) forced designers to look for new solutions to its problems.

However, in the summer of 1944, the problem of the poor AP performance disappeared. The performance of the D-25T gun of the JS-2 against the German tanks improved dramatically. The reports from the front described cases where the BR-471 APHE round 122 mm projectile fired from 2500 metres

Germans also showed that the front protection of its hull was not impenetrable.

In the beginning of 1944, an attempt was made to improve the protection of the JS-2 by tempering the front armour to very high hardness. In practice, it led to a drastic increase in the number of components needed for the hull and significantly increased the cost of the tank's production.

In March 1944, firing tests were conducted with a 76.2 mm Gun ZiS-3 firing at an JS-2 tank from 500-600 metres. The tank's armour was penetrated from all sides of the tank. Whilst while most of the projectiles did not penetrate the armour completely, they created major splintering and fragmentation inside the turret. This explains the considerable losses of JS-85 and JS-122 tanks during the Winter-Spring of 1944.



The JS-2 heavy tank with unusual cmouflage. 4th Guards Tank Army during Summer 1944.

In February of 1944 the Central Scientific Research Institute #40 (TsNII-40) was delegated the task of researching the armour protection of the JS-2 heavy tank. The research showed that, given the existing shape of the front of its hull, the tank would be invulnerable to penetration by any German 75-mm and 88-mm AP projectiles only if the hull's armour thickness were increased to at least 145-150mm (i.e. an addition of 20-30 mm thickness).



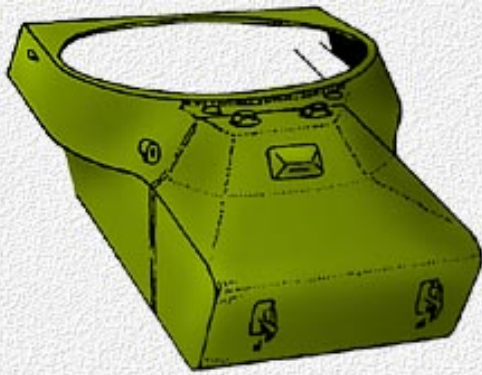
The standard model of the JS-122 (JS-2) tank.

This one with "straight" nose seen at the ChKZ Factory in 1944.

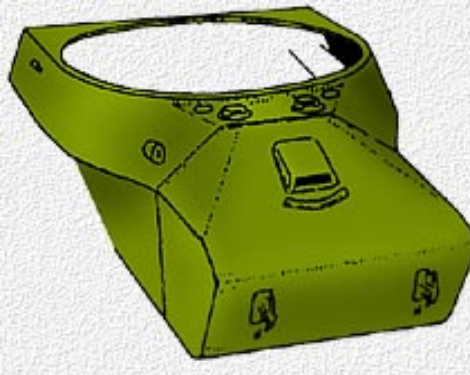
On the recommendation of the TsNII-40, new specifications for armour tempering and a new design for the front of the JS-2's hull were developed. The new hull, with a straightened glacis, preserved the same

armour thickness while the plug-type driver's hatch was removed, greatly increasing its protection from the front. The glacis was sloped at 60 degrees from the vertical, which resulted in the German 88 mm KwK 36 gun being unable to penetrate it even at point-blank range when fired at a ± 30 degrees angle.

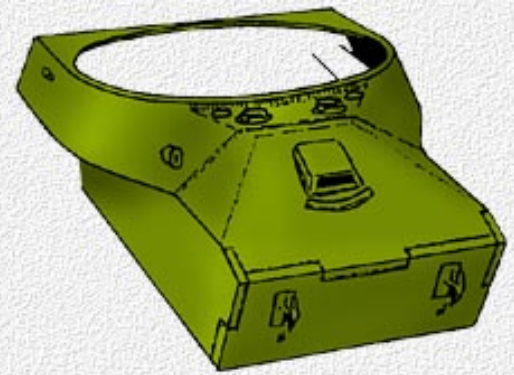
FIGURE 5. Nose shapes used for JS-1 and JS-2 tanks



The nose shape of the first production JS-1 and JS-2.



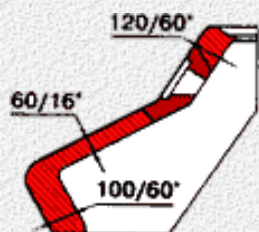
The cast "straight" nose shape of the JS-2.



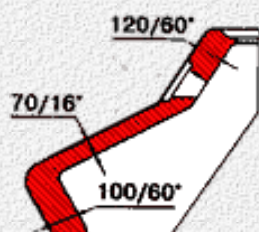
The welded nose shape for JS-2 tank. Only UZTM produced tanks with this nose.

However, the lower front hull armour plate, sloped at 30 degrees from the vertical, remained vulnerable. To increase its slope would require significant alteration to the layout and design of the driver's compartment. Since the probability of a hit on the lower part of the hull was low, it was decided to leave the design unchanged. From July 15 1944, spare tracks were attached to the lower hull to increase its protection. In May of 1944, the **UZTM** plant started manufacturing the new straightened welded hulls. Factory #200 began making the new type of hulls from June of 1944, but these were cast, not welded. However, for a while, tanks with old and new hull-types were produced simultaneously.

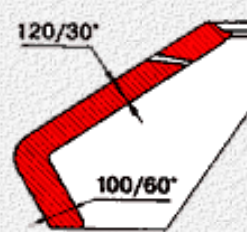
FIGURE 6. Cross-sections showing different arrangements for joining the frontal armour plates.



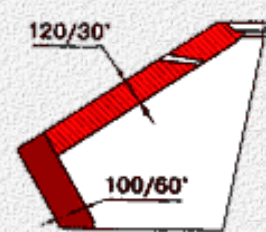
**Cast
(prior to
21.12.1943)**



**Cast
(prior to June
1944)**



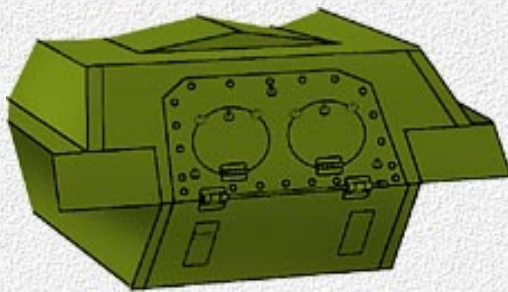
**Cast
(from summer
1944)**



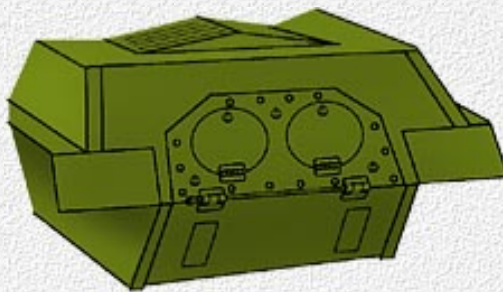
**Welded
(from summer
1944)**

As for the tank's turret, it turned out to be impossible to increase its armour protection. Designed for the 85 mm gun, it was completely balanced. After installing the 122 mm weapon, the turret became very unbalanced. The Design Requirements intended for an increase of its frontal armour thickness to 130 mm which would have unbalanced the turret even further and would have made a new traverse mechanism necessary. Since all these changes required a complete redesign of the turret, they were all cancelled.

FIGURE 7. Rear plate shapes used for JS-1 and JS-2 tanks



Shape of rear plate of first series tanks.



Shape of rear plate from 23.11.43



Finishing the JS-2. ChKZ Factory, 1945.

Nevertheless, the appearance of the turret was considerably changed in the process of its production. The first batch of tanks manufactured in 1943 had a narrow porthole through which the sighting telescope fits. After the installation of the D-25T Main Gun, it became almost impossible to use the telescopic sight, even though its breech was the same as that of the D-5T.

Starting in May of 1944, a new turret with a widened porthole was manufactured, which resulted in the sight being moved to the left. The armour protection of the tank's mantlet was improved and the armour

thickness of the sides of the lower hull was increased.

The commander's cupola was shifted 63 mm to the left and the PT4-17 periscopic sight was changed to a MK-IV sight. A DShK anti-aircraft machine gun (designer P.P.Isakov) was installed on the commander's cupola. After that, no further significant changes were made to the turret until the end of the war.

The last myth I would like to resolve: today some people often call a late-war JS-2 as "JS-2m" or "JS-2M". In fact, JS-2M didn't exist whilst JS-2m appeared in 1954-56 after a serious modernisation programme. Therefore, all war-time JS-2 tanks designated as "JS-2" without any additional suffixes.



The post-war modernised JS-2m Heavy Tank in Kibunka. *(V.Potapov)*

Basic Modifications of the JS Series

- Object 233
- Object 234
- Object 235
- Object 236
- Object 237 = JS-85 = JS-1
- Object 238
- Object 239 = KV-85
- Object 240 = JS-122 = JS-2
- JS-2M (modernised)
- JS-3
- JS-4
- JS-5
- JS-6
- JS-7
- JS-8
- JS-9
- JS-10 = T-10

Please Note:

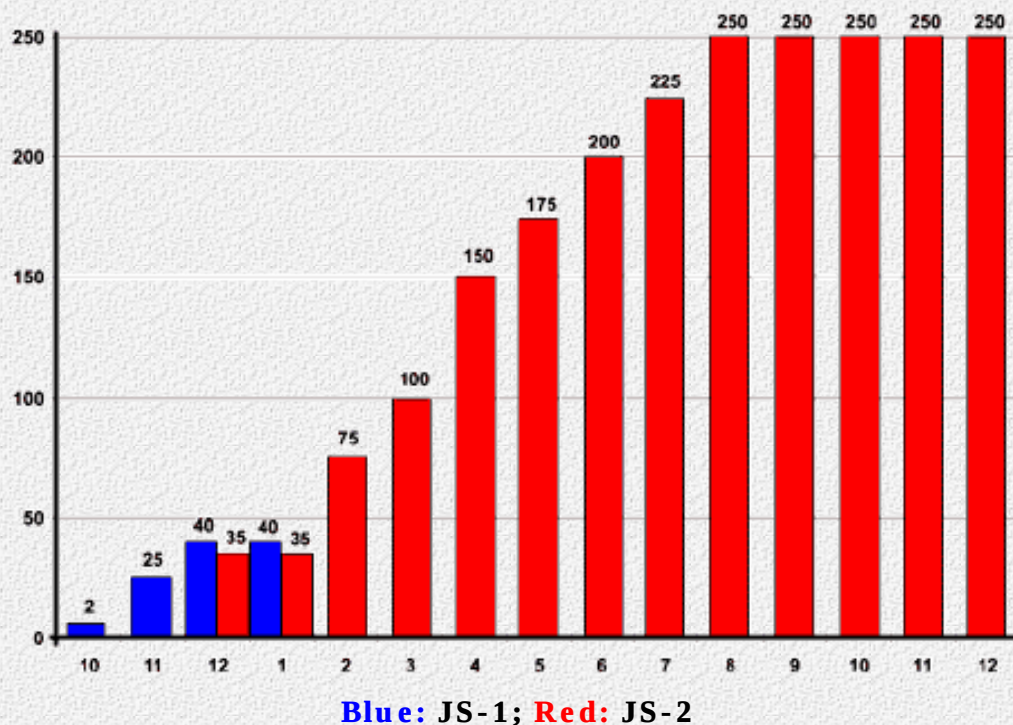
IS-1 and IS-85 are designations for the same tank.

IS-122 and IS-2 are designations for the same tank.

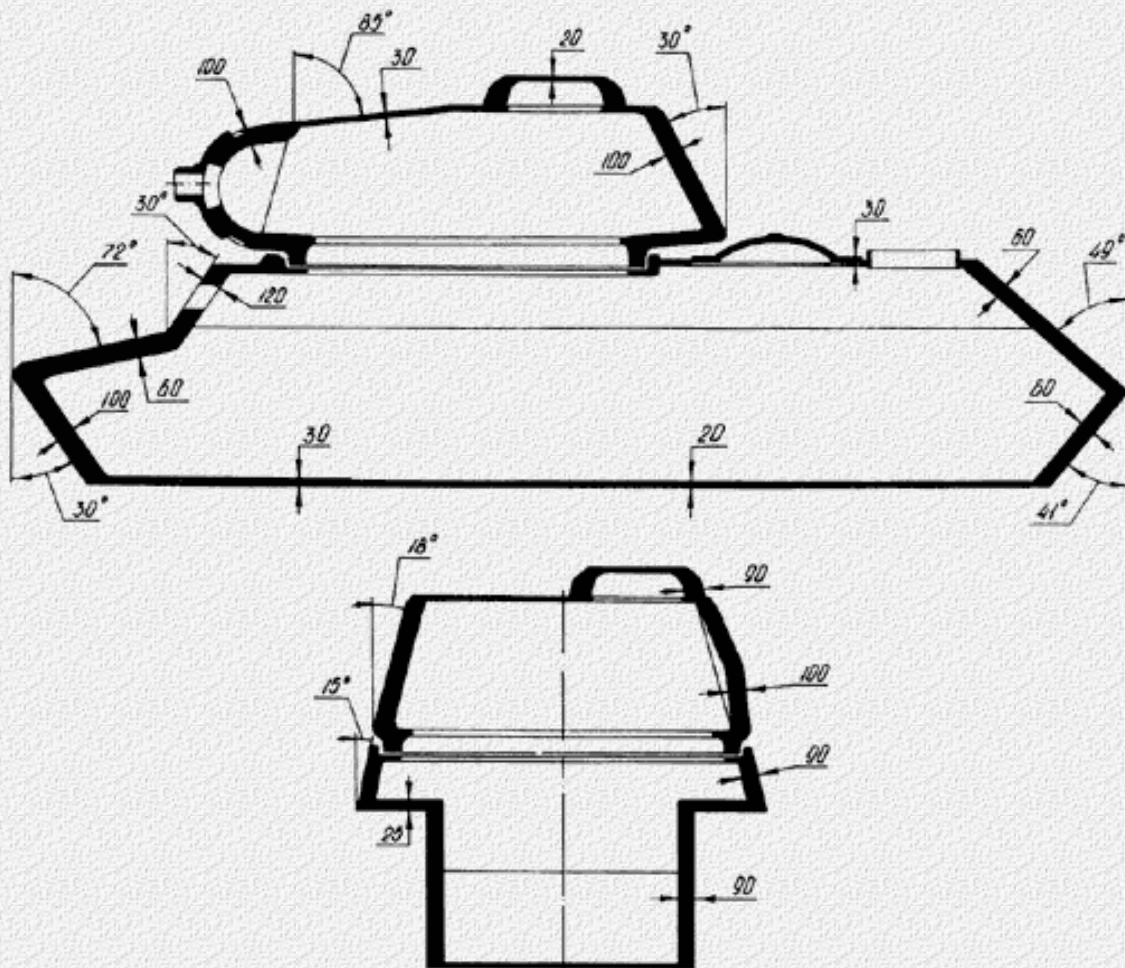


The JS-2 heavy tank from the 64th Guards Heavy Tank Regiment of the 3rd Guards Mechanised Corps of the 1st Baltic Front. Shaulay area during July 1944.

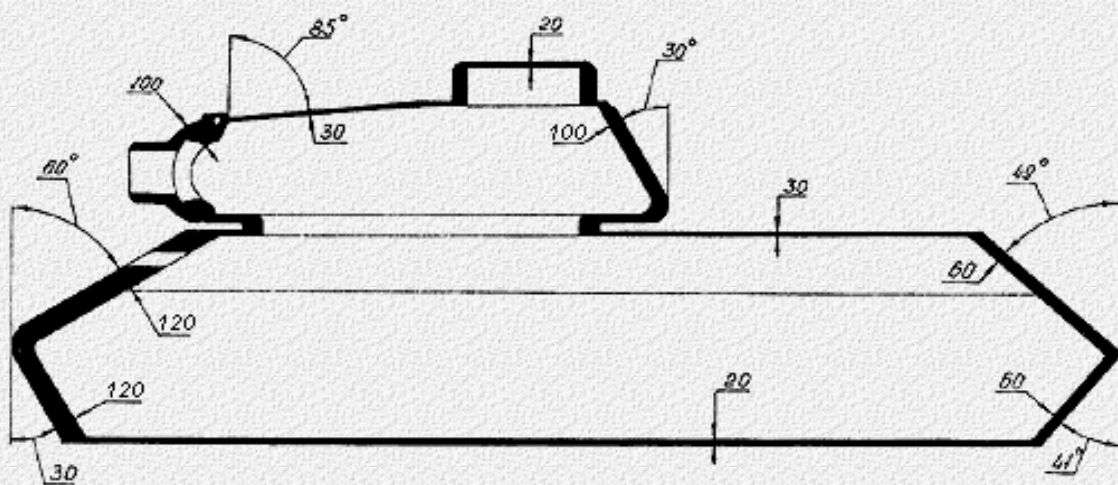
The Production Output of JS Tanks in 1943-1944.

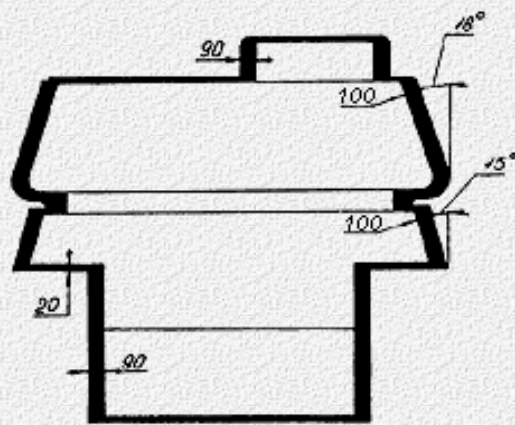


Armor Protection for JS-1

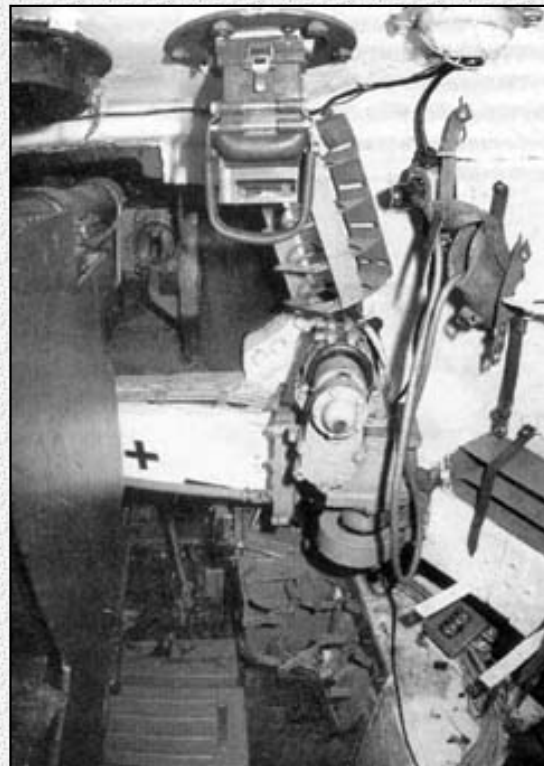


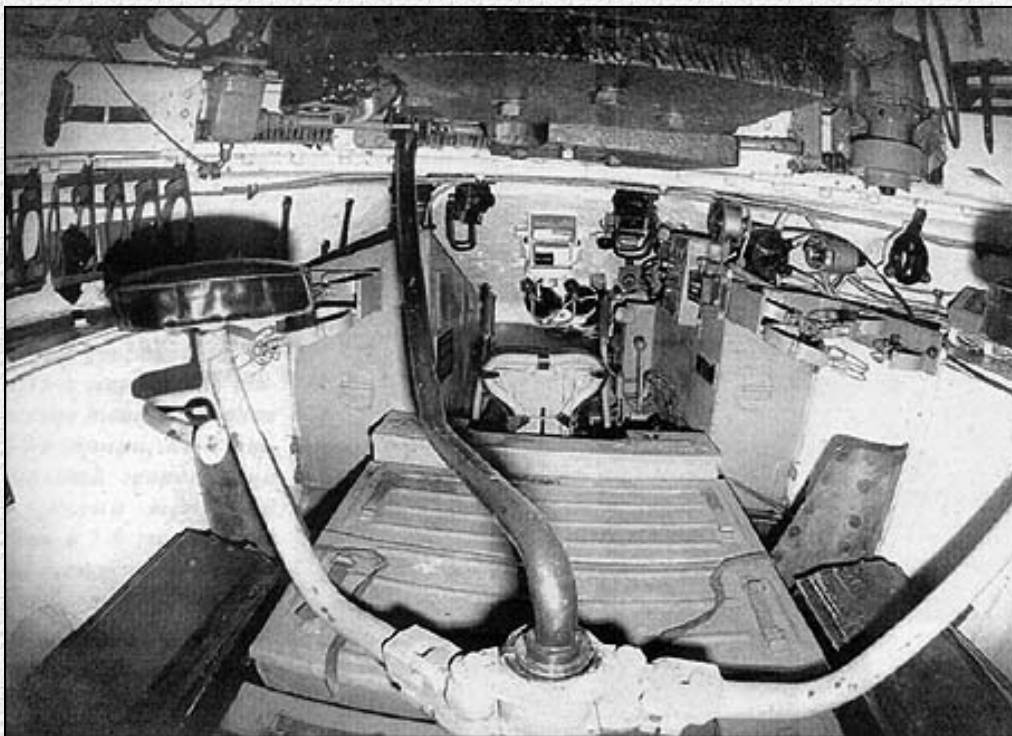
Armor Protection for JS-2





Interior of the JS-2





REFERENCES:

[JS-1 and JS-2 in action](#)

[The JS-2 in comparison with its German counterparts](#)

[The profile of the JS-1](#)

[The profile of the JS-2](#)

[Detailed interior view of the JS-2](#) [Report on the results of testing of the 100 mm and 122 mm tank guns](#)

[The specification of the D-5T and the D-25T guns](#)

[The ammo used for the D-5T and the D-25T guns](#)

[The armor penetration of the D-5T and the D-25T guns](#)

[Specification of Soviet tanks](#)

[Specifications of Soviet tank guns](#)

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Sources:

"The JS heavy tank", Manual, 1944;

"Artillery armament for the Soviet tanks 1940-1945", Armada-Vertical #4, 1999;

"Report of the artillery tests of the armor protection of JS-85 and JS-122", NII-48, Sverdlovsk, 1944;

"A short technical report about the improving the armoring of the JS", NII-48, Sverdlovsk, 1944;

"Studying the JS tanks being destroyed in summer-autumn 1944", NII-48, Sverdlovsk, 1945;

"From the experience of usage a tanks during the Great Patriotic War. Part I", 1946;

"Heavy tanks and SP guns in action", NKTP, 1945;

"About the tactic of the heavy tanksand SP guns during the street fighting", Handbook, 1945;

M.Svirin "The JS tanks" Armada #6, 1998.

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Heavy Tanks of the JS Series

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Combat employment of the JS-1/JS-2



Russian Battlefield

A JS-1 of the 3rd Byelorussian Front in the Baltic States, 1944.

In February of 1944 all existing heavy breakthrough tank regiments, which were equipped with KV tanks, were re-equipped according to the new TO&E. Simultaneously, some new units were formed. These units were equipped with the newest JS tanks. During formation they received



A JS-2 crew receiving a combat order. 82nd Independent Guards Heavy Tank Regiment in the Baltic states, 1944.

"Guards" status (in advance of their combat importance). According to TO&E, these regiments (each with 375 men in total) consisted of: four tank companies of 21 tanks (5 tanks per company plus one commander's tank), an SMG infantry company called "tankodesantniki" (infantry which ride on tanks), one antiaircraft battery, a sapper platoon, a medical platoon and a signal platoon.

A feature of the JS tank was that each crew consisted of two officers (lieutenants): a tank commander and a driver. Another two members held the rank of sergeant: a loader and a gunner. Unfortunately, not all crewmen had fought in heavy tanks ([KVs](#) and [Churchills](#)) before. Many tankers didn't have any experience and came from tank schools, sometimes after additional courses.

One of the first units involved in battle was the 13th Guards Heavy Breakthrough Tank Regiment. By February 15, 1944, that regiment arrived in the region of Fastov - Belaya Tzerkov' with 21 JS-1 tanks. It was ordered to support the 109th Tank Brigade in an assault on Lisyanka village (Ukraine).

This fighting took place during the Korsun-Shevcheskovsk Operation. The 109th Tank Brigade was an element of 16th Tank Corps which was attached to the 2nd Tank Army. This Army fought against the German 3rd Panzer Corps. A commander of the 13th Regiment detached one company of 5 JS-1's and sent them into action. At that moment all the tanks of 109th Brigade were knocked out by German Panthers and assault guns camouflaged somewhere in the village.

Soviet tanks approached within 600-700 metres, when the Germans opened fire. All the Soviet tanks were knocked-out; two of them were burned out. Each of the JS's received up to 7 hits. The next day Lisyanka was encircled and liberated. The Russians captured 16 abandoned Panthers, 2 Pz-IV and 2 StuG-40. They were abandoned after running out of fuel.

On March 15, 1944, fifteen JS-1's from the 13th Guards Heavy Breakthrough Tank

Regiment were supporting an attack of 50th Tank Brigade near the Uman'. During that battle, five JS-1 were destroyed by German 88 mm Flak guns. Three tanks failed due to technical breakdowns, and one tank fell into a river (near Polkovnichie). During that battle a rare incident occurred: the lower frontal armor of an JS-1 was penetrated by a German Pz.B-41 anti-tank rifle.



**A JS-2 with a muzzle brake of the "German type",
1944.**

The first verified engagement between JS-1's and Tigers I occurred on the 4th of March, 1944 near the Staro-Konstantinov (Ukraine). During the Proskurovsko-Chernovitsky offensive operation the 1st Guards Heavy Breakthrough Tank Regiment (of Colonel N.I.Bulanov) was involved in a battle with a company of Tigers of the

503rd PzAbt. One of the JS-1's was destroyed from a range of between 1500 and 1800 metres and another two were damaged in various ways though were capable to move.

The main gun of one of the Tigers was also damaged in the engagement. Another Tiger received heavy damage in the chassis. On March 16 of 1944, several Tigers ambushed a company of JS-1's. Two of the Soviet tanks were burned out with their crews. During 8 March, on a number of occasions, a couple of JS-1's were destroyed by a battery of 75 mm PaK 40's from the lethally short distance of 150-200 metres. The first JS received 8 hits and the second tank - 4 hits.



A platoon of the 27th Heavy Breakthrough Tank Regiment entering the liberated Vyborg on June 20, 1944.



To protect a tank from German grenadiers, the Russians re-installed the rear MG on the roof of the turret, seen here in 1944.

Analyzing the results of those battles, the **GBTU** came to the conclusion that the armament and protection of the JS-1 didn't correspond to its intended tasks and was inferior to the German heavy tanks. GBTU recommended increased armor protection and rearming the JS-1 with a more powerful weapon.

The JS-2 tank happened much more dangerous to German tanks because the 122 mm D-25T gun had better armour-penetration than the 85 mm D-5T. Furthermore,

its fragmentation and high explosive ammunition was also quite effective against armored targets. Like the JS-1, the JS-2s had their "baptism of fire" during the final

stage of liberation of the right-bank Ukraine.

It is necessary to remind readers that the first time the JS-2 saw the action was not in the Korsun-Chevchenkovskaya operation, but in the subsequent battles: Proskurovo-Tchernigovskaya and Umansko-Botochskaya operations. On the two regiments (11th and 72nd Independent Guards Heavy Tank Regiments) equipped with these tanks the most successful was the 72nd Regiment, especially during the period from 20 of April to 10 of May 1944.

During that period, the Regiment was incorporated to the 1st Guards Tank Army and took part in actions near Obertin (Ivano-Frankovsky region). After 20 days of non-stop fighting, they lost only eight JS-2s, the Regiment destroyed forty one Tiger I and Elephants/Ferdinands (this is according to some After Battle Report, but more likely there were StuGs, not Ferdinands) , 3 ammunition carriers and 10 anti-tank guns. The most significant information about JS-2 capabilities is given in a Tank Damage Report of that period:



JS-2 tanks entering Berlin, 1945.

"The 20 of April, tank #40247 came under fire from a self-propelled gun "Ferdinand" from a range of 1500-2000 metres. The tank-crew could fire only one shot

because of the faulty firing mechanism. Manoeuvring to get away from the fire of self-propelled gun, JS-122 received, without any damage, 5 hits on the frontal plate. Meanwhile another unseen "Ferdinand" approached from the flank at a distance of 600-700 metres and perforated close to the right side of the engine compartment with an armor-piercing round. The crew left the immobilized tank, which burnt suddenly.

Tank #40255 received a direct hit by a 88 mm round of "Tiger" in the frontal lower plate at a the distance of 1000-1100 metres. Because of that, the left fuel tank was penetrated and the driver was wounded by a fragment of armour. The rest of the crew received light burns. The tank was burnt out.

After receiving three shots from the 88 mm Tiger's rounds on the nose from a distance of 1000-1500 metres, tank #4032 was destroyed by fire from another Tiger some 400-500 metres away. An 88 mm armor-piercing round penetrated the sloped armor plate from the right side. First the shell-case charges ignited, and then the fuel. The crew left the tank and evacuated the driver to the rear.

After being holed by 88 mm round of a "Tiger", from the distance 400 metres, on the frontal armor; the tank #4033 was towed to the to a repair facility for repair.

Tank #40260 was burned out after receiving a 88 mm round from a "Tiger", which fired at the left side from the flank at a range of 500 metres. The round damaged the engine and the tank ignited. The commander and the driver were wounded.

Tank #40244 received a hit from an 88 mm armor-piercing round fired by a "Tiger". The hit was received at the close range of 800-1000 metres in the right side of the hull. The driver died and the diesel fuel from damaged right fuel tank ignited. The tank was evacuated and blown up by sappers.

Tank #40263 caught fire after two rounds hit its side.

Tank #40273 was on its own, apart from the Regiment, and the 30 of April, near Iggisk, received two direct hits: the first in the turret and, immediately after, the second in the side plate of the engine compartment. The crew in the turret died at once, and the driver was wounded. The tank was left in enemy territory. During the combat, the tank crew participated in the repulse of the attack of 50 T-IIIs, T-IVs and T-VIs **[the Russian term for Pz-III, Pz-IV, Pz-VI - Valera P.]** which were supported by artillery and air attacks.

Tank #40254 was damaged from a distance of 800-1000 metres, by a "Ferdinand" in ambush. The first round did not penetrate the turret ring, but the second round put the engine out of order. The crew was evacuated and the tank was burnt out on the battle field.

Tank #40261 received a direct hit into the gun barrel. After the combat the barrel was changed for a new one."

[Please note: although the Russians often confused StuG with the Ferdinand, in this report the Ferdinand was confused with the Marder. - Valera P.]

Moreover, one tank was evacuated and taken away for rebuilding and the Regimental repair crew repaired other five damaged tanks.

From the middle to the end of May 1944, the Regiment was incorporated into the 18th Army, which participated in defensive actions against enemy counterattacks south-east of Stanislav.

From June 1944 to the end of the war, the Regiment was incorporated into the 4th Tank Army. The Regiment took part in the Lvov-Sandomirs, Nizhne-Silezskaya, Verkhne-Silezskaya, Berlin, and Prague offensive operations. For the liberation of Lvov, the Regiment was honored with the name "Lvovskiy". For military services during the war the



Clearing the gun after fighting.

Regiment was decorated with the Orders of Red Banner, Suvorov 3rd grade, Kutuzov 3rd grade, Bogdan Khmelnitsky 2nd grade and Alexander Nevsky.

Despite the fact that the career of 71st Independent Guards Heavy Tank Regiment, equipped with the JS-2s, was not so remarkable, it still deserves special attention. In August 1944, the Regiment, together

with 6th Guards Tank Corps, participated in the defeat of Konig Tiger battalion on the Sandomir bridgehead.

The best source of what happened is the [Report about operations of the 71st Independent Guards Heavy Tank Regiment](#).

JS-2's and Tigers I and II engaged only occasionally. For example, in November 1944, there was a battle where several JS-2's were involved in close battle with German tanks of the 503rd PzAbt (near the Budapest, Hungary). A larger battle occurred on 12 January of 1945 during the Visla-Oder offensive operation: a column of Konig Tigers of the 524th PzAbt was involved in close combat with Soviet tanks near Lysov. Both sides suffered heavy losses.



JS-2s in the initial position before an offensive in Eastern Prussia, 1945.



A JS-2 with anti-HEAT shields in 1944.

It is important to remark that the Germans weren't able to access and analyze the JS-2 for quite a long time. That was because the Russians were in control of the battlefields. Such a case happened only in May of 1944 near the Rumanian town of Tigru-Frumos.

From December 1944, formation of new Independent Guards Heavy Tank Brigades was begun. Usually they were based on existing Tank Brigades which were equipped with the [T-34-85](#). First of all, these new groups were formed to overcome well-



A JS-2 crossing a river over the fascine-brushwood dam. The tank belongs to the 3rd company of 4th Polish Heavy Tank Regiment. Notice one road wheel is absent. April 1945.

prepared German defences and, in addition, for successful combat with German tank units.

According to the TO&E, each of the new Independent Guards Heavy Tank Brigade consisted of three heavy tank regiments, one motorised SMG infantry battalion, and support units such as signals, medical, etc. The total strength of an Independent Guards Heavy Tank Brigade was

1,665 men, sixty five JS-2 tanks, one light SP battery of three [SU-76M](#), nineteen lend-lease M3 half-tracks and three armored cars. In total, five Independent Guards Heavy Tank Brigade were formed. Two of them - the 7th and 11th - took part in the Berlin Operation.

At the end of the war, each Tank Corps should have at least one Tank Regiment of JS-2 tanks, which were best for breaking through a heavily entrenched enemy line. A single 122 mm shot could penetrate the armored cupola of a concrete bunker, or shatter the main redbrick walls of the Konigsberg. At that time, an infantryman with a Faustpatrone, a Panzerfaust, or even a Panzerschreck, became the most dangerous enemy of the JS-2. Russians didn't distinguish these weapons and called them all "faust". Thus, an infantryman with a "faust" was called a "faustnik". During street fighting, about 70% of destroyed tanks were hit by "fausts".

From the beginning of 1945 Soviet tanks received shields of various designs. These shields were intended to protect from HEAT munitions (e.g. "fausts"). Most of these shields only protected turret, whilst hull remained unprotected. That was not so bad, as many people think now, because over 80% of "faust" hits were on the turret side. A shaped-charge round would completely destroy the shield, but leave the main armor unbreached, leaving a small black hole in it. Soviet tankers called such holes as "the kiss of the witch".

Unfortunately, these shields might be torn off by a shell, or explosion. The result could be fatal. Lieutenant-Colonel V.Mindlin (a participant of battles for Berlin) wrote in his

memoirs "The Last Battle - the Hard Battle!" about this:



A JS-2 heavy tank from the 29th Guards Heavy Breakthrough Tank Regiments, 1st Ukrainian Front. Poland, in January 1945.

"Here is a tank with battened down hatches... but the crew is silent. They respond to neither radio nor knock. There is a small hole with a diameter no more than a cent. That was a "faust", that was its work. A shield was torn off, and a next round penetrated the armor...

Those who saw a tank battle knew how terrible death could be for tankers. If a round hit the ammunition or fuel tanks, a tank would be destroyed at once - just blast off and the crew perishing without any torture.

Often a round just penetrates the tank's armor but doesn't hit the ammunition or fuel tanks. All crewmembers are wounded, their tank is burning, but the crew is unable to extinguish the flame. They need to escape the tank and run off to a safe distance. However, the tankers are wounded and they simply can't do that, they can't open the locked hatches. And you can hear the cries of those being burned alive. You can't help them because the hatches are locked inside..."



Russian Battlefield

Soviet JS-2s in Pomerania. The 1st Byelorussian Front, 1945.



Russian Battlefield

A tank commander firing from the DShK machine-gun. Danzig during Spring 1945.

It was very dangerous to fight with open hatches (and prohibited, by the way) because enemy infantry could throw a grenade into a tank. Thus, all crews received an order to close hatches but not to lock them. As a result the losses crew were reduced.

For better performance in street fighting, the Russians used a special formation called "elochka" (a fir-tree). A

tank platoon (4 tanks) was divided into two pairs. The first pair moving on both sides of a street (the first tank on the left side, the second - on the right) in order to destroy any targets. This pair is covered by the second pair which moved towards them and protect them with additional gunfire until the first pair reload their guns.

Each tank company was supported by one infantry platoon. They protected their tanks from "faustniks". Additionally, special assault troops were formed. They consisted of one

SMG platoon supported by a gun, usually a 76 mm [regimental](#) or [divisional](#) gun. Michael Badigin mentioned those troops in his [memoirs](#).

DSHK heavy machine-guns were very useful against enemy infantry. Unfortunately, they caught on tram-wires, so some crews dismounted these MGs before entering the cities.



Russian Battlefield

The first street fighting in Berlin, April 1945.



Russian Battlefield

Street fighting in Berlin, April 1945.

Besides the Red Army, the JS-2 served in the Polish Army (Wojsko Polskie) - there were 71 tanks in the 4th and 5th Heavy Tank Regiments. During battles in Pomerania, the 4th Heavy Tank Regiment destroyed 31 enemy tanks and lost only 14 tanks.

Both regiments took part in the battle for Berlin.

Poles planned to form another two regiments - 6th and 7th - but the war ended, so that plan was abandoned. At the end of the war, the Poles had 26 JS-2 heavy tanks; they returned 21 tanks to the Red Army. The remaining 5 tanks served in the Polish 7th Tank Regiment.

In the spring of 1945, just before the liberation of Prague, the Czech Army received several JS-2's.

In the beginning of the 1950's, several JS-2 heavy tanks were sent to China. According to some documents, during the Korean war, Chinese volunteers used them against the Americans. Unfortunately I was unable to verify this. American intelligence spotted at least four Chinese independent tank regiments. Each regiment consisted of four companies of T-34-85's and one company of JS-2's (five tanks).



A JS-2 on the Berlin highway during Spring 1945.



A column of JS-2 tanks of the 1st Czech Tank Brigade. April 1945.

During the war in Indo-China, French forces met with JS-2's which had been sent from China to Vietnam. A single ex-German Panther was sent to Vietnam for trials and to counter the JS-2 tanks, but it got mired in the jungle.

In the early 1960's, Cuba received two regiments of JS-2's. Some western sources say these tanks

are still serving in the coastal defense system as pillboxes.

At the same time, some JS-2's were sent to North Korea. Two Korean tank divisions had one heavy tank regiment each.

In the Soviet Army, the JS-2M served for a very long time. They survived the later [JS-3](#) and [JS-4](#). They were supposed to be replaced with the [T-10](#), but that did not happen. In the 1970's, they were used in the Far East fortified sectors as pillboxes.

The last time the JS-2M tank was used was in 1982 in the Odessa Military District during manoeuvres. However, the official order to remove the JS-2 from service was only issued in 1995! I doubt that an unsuccessful tank could serve for such a long time! All German tanks and projects were abandoned much earlier, it is important to keep in mind during the absurd (but still very popular) "best tank of..." debates.



A Chinese JS-2 heavy tank. 1952.

REFERENCES:

[Development History of the JS-1/JS-2](#)

[The JS-2 in comparison with its German counterparts](#)

[The profile of the JS-1](#)

[The profile of the JS-2](#)

[Detailed interior view of the JS-2](#)

[Report on the results of testing of the 100 mm and 122 mm tank guns](#)

[Report about operations of the 71st Independent Guards Heavy Tank Regiment](#)

[Specifications of Soviet tank guns](#)

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Sources:

"JS heavy tank", Manual, 1944

"A short technical report about the improving the armoring of the JS", NII-48, Sverdlovsk, 1944

"Studying the JS tanks being destroyed in summer-autumn 1944", NII-48, Sverdlovsk, 1945

"From the experience of usage a tanks during the Great Patriotic War. Part one", 1946

"Heavy tanks and SP guns in action", NKTP, 1945

"About the tactic of the heavy tanks and SP guns during the street fighting", Handbook, 1945

M.Svirin "The JS tanks", Armada #6, 1998.

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Heavy Tanks of the "JS" Series

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The JS-2 in Comparison with Its German Counterparts

A comparison of the JS with German heavy tanks of WWII shows the big difference in design and war theories between the USSR and Germany. For example, according to the Soviet classification system, the JS-2 was a heavy tank, while the Panther was a medium tank according to the German classification system. In fact, both tanks were of equal weight. So why the difference of classification? Simply, because Soviet tank designers thought the weight of a vehicle to be the most important parameter by which to define most other parameters like engines, armor, armament, ammunition, fuel capacity, suspension and so on. At the same time, German designers distinguished tanks by their battle capabilities - mostly by armament and armoring. That's why Pz-IV's of the first series were considered "heavy", and Pz-IV's of later versions were designated as medium (even though heavier!) as was the 45-ton Panther. By the German system, the JS-2 would be a super-heavy tank (because of 122 mm Gun and a 12.7 mm HMG). So the German system seems to me awkward for comparing the tanks of different countries. Thus, I chose the Soviet classification system. If you wish, you may choose another system, but use the same system for all tanks.

It is important to say, that in German production the tanks are divided into three classes:

- *leichte* means light
 - *mittlere schwere* means medium heavy
 - *uber schwere* means super heavy (both Panther and Tiger belongs to this class)
- Thus, it's three classes as all other have, light, medium and heavy. It is a translations error to call JS-2 as a "super-heavy", because the Germans used their word for heavy (*schwere*) twice.

The Panther as an Adversary of the JS-2



JS-2 knocked out in Byelorussia. 1944.

The weight of both tanks was the same. The JS-2 had better penetration ability, it could penetrate the Panther's frontal armor from 1100-1200 metres, while the Panther could penetrate the JS-2's armor from only 600-700 metres. In addition, the 122 mm gun had greater HE ability which is extremely important for combat with anti-tank guns and infantry (the weight of a 122 mm fragmentation shell was 25 kg, while the German - only 4.7 kg).

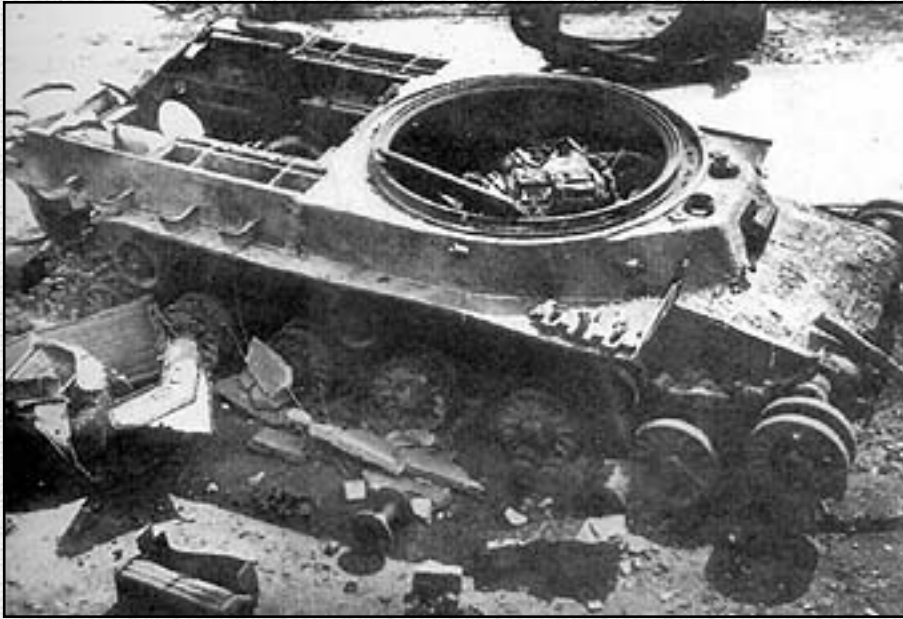
One of the main drawbacks of the JS-2 was a small magazine - only 28 shells (the Panther had 81 rounds). The JS-2 had multi-part loading shots which slowed reloading and, as a result, resulted in a low rate of fire.

Today, most tank enthusiasts are interested in the AP ability of tank guns, forgetting the HE ability. However, that is ridiculous and stupid! The JS-2 was a heavy breakthrough tank, i.e. a tank intended for breaking through the enemy's lines of defense. In other words, the main targets of this tank were infantry and artillery. Thus, a tank with a large gun with great HE capability was needed. History showed that the JS-2 used about 70% of its HE ammunition and only 30% of its AP ammunition.

That's why the HE ability was considered more important.

Also, the JS-2 had much better armor protection than the Panther, but heavy armoring constrained by low weight dictated less internal space for the JS-2's crew and ammunition (this was the main reason for the small ammo magazine). Moreover, the Panther had better specific power - 15 hp/ton, while the JS-2 - only 11.3 hp/ton, which was also very important.

The Tiger as an Adversary of the JS-2



A destroyed JS-2. A hit caused an explosion of the magazine. Berlin. 1945.

Compared with the Tiger, the JS-2 was slightly better protected even though it was ten tons lighter.. The 88 mm and 122 mm guns had more or less the same AP ability, but again, German gun had less HE ability. Both tanks could penetrate each other's frontal armor from ~1000 metres. At greater distances success highly depended on experience of the crew and battle conditions.

The JS-2 had thicker armor, thus it had a better chance at distances over 1500 metres. On the other

hand, the Tiger had better optics and thus had a better chance of hitting the JS-2. The main drawback of the Tiger was the slow angular velocity of the turret. However, the Tiger had an excellent length/width ratio (almost 1:1) which made it extremely maneuverable. And if the Tiger could not traverse its turret fast enough, the whole tank could swivel to bring the gun to bear.

The King Tiger as an Adversary of the JS-2



King Tigers before a battle. Hungary.

In August 1944, new German tanks appeared on the Eastern Front: King (Koenig) Tigers. Weighing 68 tons, this tank was larger and much heavier than the JS-2.

The first engagement of Soviet tanks with King Tigers did not favor the Germans; on August 13 of 1944 a company of JS-2 tanks (the 3rd Battalion of the 71st Guards Heavy Tank Regiment)



American soldier inspecting a knocked out JS-2 (the hole of penetration is marked in white). Later, the turret of this tank was sent to Aberdeen (USA) for tests. 1945.

flee in panic. [Details of that battle are here.](#)

Anyway, engagements between JS-2's and King Tigers were rare because the Germans seldom used them on the Eastern Front. On 12 November 1944, not far from Budapest, a skirmish occurred between JS-2's and King Tigers of the 503rd PzAbt. Both sides lost several tanks. On January 12, 1945, a column of King Tigers of the 524th PzAbt engaged in close combat with JS-2's (near Lisuv). In the fierce battle both sides had heavy losses.

It is not fair to compare the JS-2 and King Tiger because of the large disparity in weight - more than 20 tons! It would be better to classify the King Tiger as a super-heavy tank. It had thicker armor and its 88 KwK gun was slightly superior in AP ability, though inferior in HE ability.

Many times I noticed some individuals tried to compare armor penetration values of the 8,8-cm KwK 43 and the 122-mm D-25T. Unfortunately, these individuals paid no attention on different nature of those values: they were calculated by different methods. In short, the difference of calculation was about 25%. Therefore, it would be better to either increase Soviet figures on 25% or decrease German figures. Of course, the result would be very approximate, but it is much better then direct comparison.

The reliability of the King Tiger was poor, especially of first series, this is clearly stated in the [follow report](#). The rate of fire of the King Tiger was definitely higher, ammo load was also larger. From the other side, the mobility of the JS-2 was much better. Further, the JS-2 was much cheaper than the King Tiger, which is also a very important consideration.

commanded 1st Lieutenant Klimenkov engaged in close combat with German tanks, knocked out one King Tiger and burnt another King Tiger. About at the same time, a single JS-2 of the 1st Lieutenant Udalov ambushed 7 King Tigers, knocked out one of them and burnt another one. Survived five German tanks attempted to retreat but Udalov made a maneuver and destroyed third King Tiger. Four other tanks

REFERENCES:

[Development History of the JS-1/JS-2](#)

[JS-1 and JS-2 in action](#)

[The profile of the JS-1](#)

[The profile of the JS-2](#)

[Detailed interior view of the JS-2](#)

[Report on the results of testing of the 100 mm and 122 mm tank guns](#)

[Specifications of Soviet tank guns](#)

Sources:

"Report of the artillery tests of the armor protection of JS-85 and JS-122" NII-48, Sverdlovsk, 1944

"A short technical report about the improving the armoring of the JS" NII-48, Sverdlovsk, 1944

"Studying the JS tanks being destroyed in summer-autumn 1944" NII-48, Sverdlovsk, 1945

"From the experience of usage a tanks during the Great Patriotic War. Part one" 1946

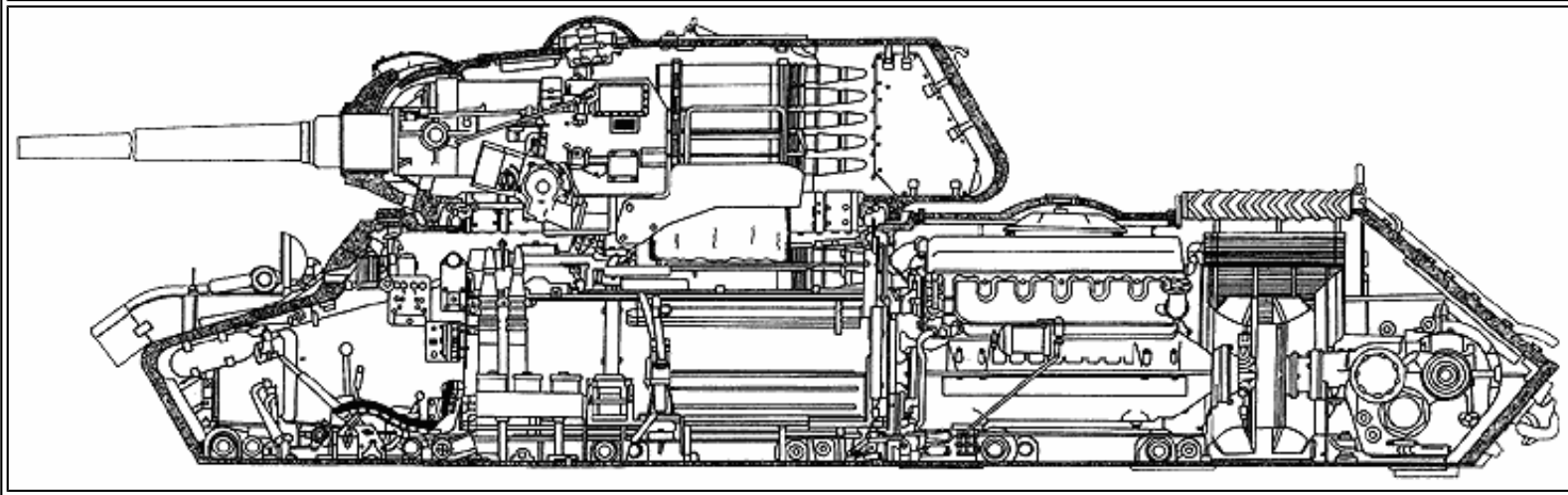
"Heavy tanks and SP guns in action" NKTP, 1945

"About the tactic of the heavy tanksand SP guns during the street fighting" handbook, 1945

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The Profile of the JS-1 (JS-85) Heavy Tank



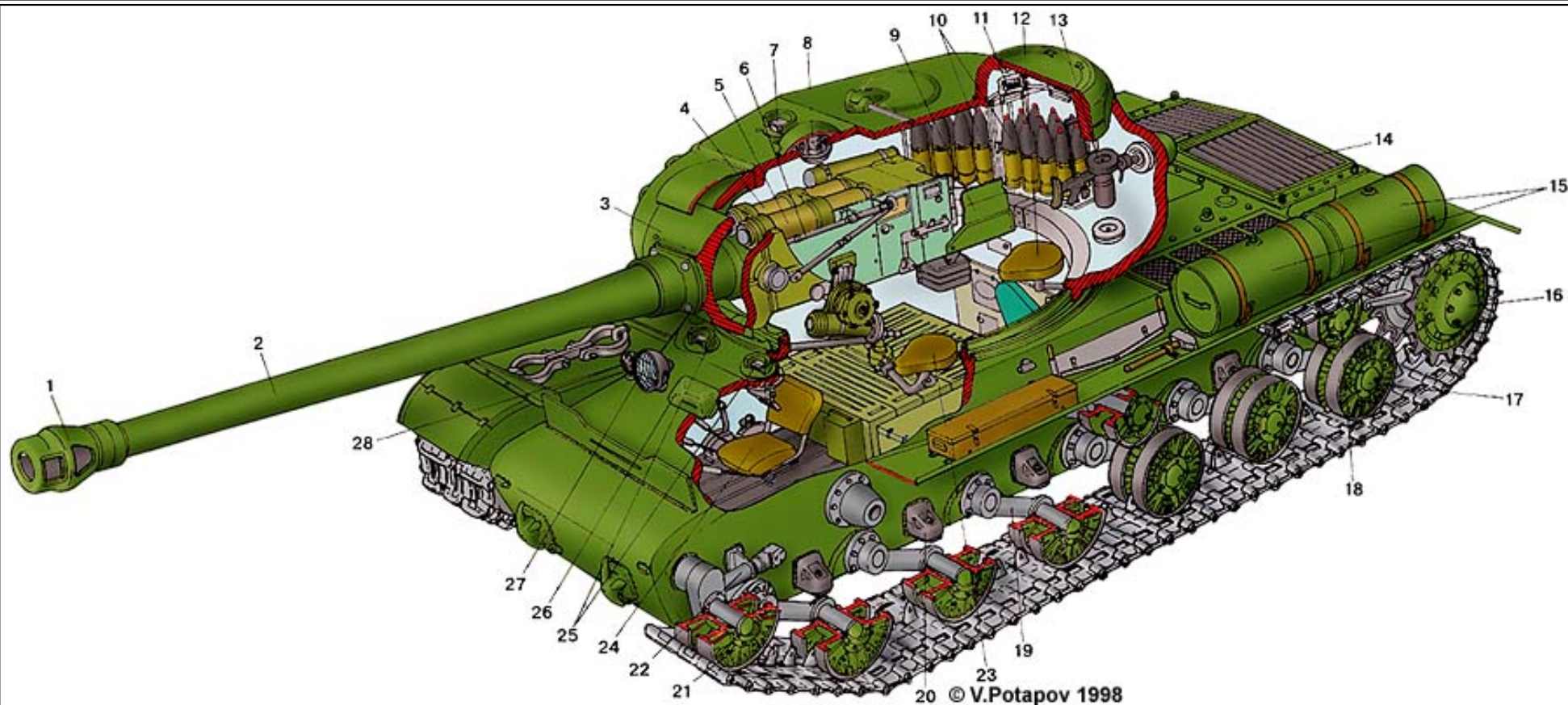
Sources:

M.Svirin "The JS tanks", Armada #6, 1998

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The Interior of IS-2 Heavy Tank



1. Muzzle brake;
2. 122 mm D-25T gun;
3. Gun's mantlet;
4. Return device;
5. Recoil brake;
6. Telescopic sight 10T-17;
7. Observation optic MK-IV;
8. Ventilator;
9. Tray;
10. 122 mm rounds;

11. Triplex;
12. Commander's station;
13. Rear MG;
14. Jalousie;
15. External fuel&oil tanks;
16. Driving wheel;
17. Road wheel;
18. Uphold wheel;
19. Bob;
20. Bob's restriction;

21. Idler;
22. Straining detail;
23. Gunner's station;
24. Driver's station;
25. Driver's optic;
26. Hatch;
27. Headlight;
28. Hooter.

Artist:

[Valeriy Potapov](#)

Sources:

"Album of construction of the heavy tank" NKTP, 1944.

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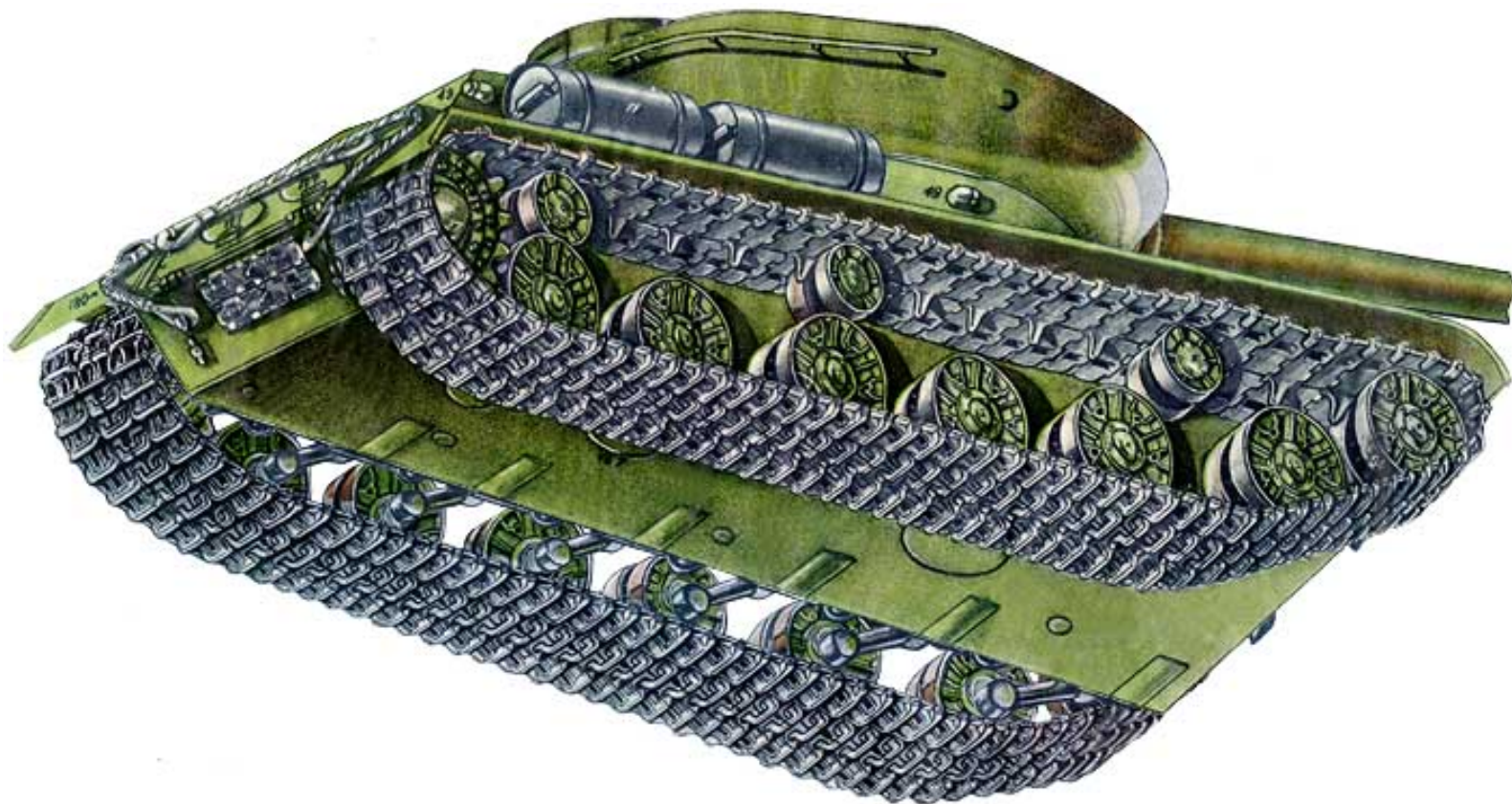
Russian Military Zone
<http://military.virtualave.net>

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The IS-3 Heavy Tank

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"Kirovets-1": the very first prototype of the IS-3 with the flat glacis.

The new "Kirovets-1" heavy tank project commenced in summer 1944. This project was undertaken after a detailed examination was performed of the types and locations of battle damage inflicted by German antitank weapons on Soviet armored vehicles. There were, in fact, two different heavy tank projects being developed under two competing engineering groups: one group led by J.Y. Kotin and A.S. Ermolaev, and the other group led by N.L. Dukhov and M.F. Baldji.



**"Kirovets-1": the final prototype of the IS-3.
1945**

The first project was based on Objects #244, #245, and #248. The main feature of this project was the unusual frontal armor (glacis). It consisted of two plates welded at an angle, which sloped down from the center on both sides. Designers called this feature a "pike's nose", while western sources call it simply a "Pike."

All previous tanks had flat frontal armor built from a single plate.

The old version had two crewmen at the front of the tank: the driver and the radio operator. By removing the radio operator's position, the driver could be relocated to the center. This allowed the tank designers to reconfigure the sides of the glacis, creating two sloping "cheek-bones." The sloping armor reduced the tank's weight and essentially strengthened the hull from the front. Moreover, it was hoped that the sloping geometry would withstand enemy fire better.

The hull of the IS-3 was welded as opposed to being cast, as most foundries were already occupied with the manufacture of turrets for the IS-2 and the T-34. At the same time, the latest advances in welding technology allowed for welded hulls of robust construction.

The second project was noted for its unusually rounded turret, fitted with a powerful 122 mm D-25T gun. This rounded turret, shaped like an inverted soup bowl, resembles modern Soviet turret design. The sloped shape deflected enemy armor-piercing shells more effectively than earlier slab-sided designs. Moreover, the turret's good internal layout minimized its dimensions while allowing its armor protection to be increased to 250 mm (the IS-2, by contrast, had only 100 mm).



The first production IS-3.

Both projects were shown to V.A. Malyshev (Minister of Tank Industry). The first project was shown by J.Y. Kotin, the second one was shown by I.M. Zaltsman and N.L. Dukhov. After detailed examination of both projects, Malyshev wisely decided to combine the best features of each. He ordered the turret from the second project to be placed on the hull of the first project. The weight of the new "hybrid" tank remained unchanged. The new tank was intended as a heavy breakthrough

tank.

In October 1944, the first prototype named "Object 703" was shown to G.K. Zhukov and A.M. Vasilevsky. They reported to Stalin about the new tank and Stalin signed an order to accept the new tank for service.

After those trials, the "Object 703" was shown to G.K. Zhukov and A.M. Vasilevsky. They reported to Stalin about the new tank and Stalin signed an order to accept the new tank in service.

The IS-3 heavy tank (or its working "Object 703" designation) as approved, boasted a very good hull and turret, with excellent armor protection. The sloped armor on the turret and hull allowed better overall protection of the tank. The rear armor plate was sloped rearwards. The centered driver's position was fitted with a sight-equipped hatch. Before opening the hatch, the sight had to be removed.



Column of IS-3's on military parade in

The semi-automatic 122 mm main gun was fitted with a muzzle brake. The rate of fire was about two to three shots per minute. Like its predecessor, the IS-2, the IS-3 normally carried 28 shells: eighteen high-explosive fragmentation rounds, and ten armor-piercing rounds. This ammunition distribution suggests that infantry and other 'soft' targets

Berlin. September 7, 1945.

were intended as the main targets for the IS-3.

The IS-3 carried four internal steel fuel tanks with a total capacity of 450 litres. The fuel tanks sat in pairs on both sides of the engine. Furthermore, the IS-3 was equipped with four cylindrical external fuel tanks. These external fuel tanks each carried 90 litres, and were connected to the internal fuel tanks. The external fuel tanks were equipped with emergency release brackets in case of a fire or a sudden attack.

The first test group of IS-3's left the factory gates in mid-May 1945. Despite western opinion (usually I hear about IS-3's seen on the streets of Vienna), IS-3 tanks weren't involved in battles on the Eastern Front. The participation of IS-3's in Far Eastern Front battles (in August 1945) is still unverified: at least one tank regiment of IS-3 tanks was sent, but Soviet combat records don't confirm any actual combat.



The IS-3 on military parade in Odessa. November 7, 1948.



**IS-3s on military parade in Berlin.
September 7, 1945.**

On September 7, 1945, a united Allied military parade was held in Berlin. The parade began with infantry columns: Soviet soldiers of the 9th Rifle Corps of the 5th Shock Army, then soldiers of the French 2nd Infantry Division, Alpine troops, and Zoaves. There was a brilliant display by the British 131st Infantry Brigade. Paratroopers of the US 82nd Airborne Division brought up the rear. After a short break, a continuous mechanized column



The IS-3 on tactical exercises. 1947

started.

The first vehicles were 32 M24 "General Chaffe" tanks and sixteen M8 APC's from the US 705th Armored Battalion, and then tanks and armored cars from the French 1st Tank Division. After that, 24 "Comet" tanks and 30 armored cars from the British 7th Armored Division. And after that... rolled 52 of the newest IS-3's!!!

That was a complete shock for all the Allies! A combined regiment of IS-3's was formed, based on the 71st Guards Heavy Tank Regiment (this unit is remembered as having [fought with first King Tigers](#) on the Eastern Front).

In the USSR, the IS-3 was introduced during a military parade on November 7, 1946. For the sake of accuracy, I have to mention that the IS-3 tanks which participated in the military parade in Berlin were distinguishable from later models as they lacked containers (boxes) mounted along both sides of the hull.

The IS-3 was in mass production until mid-1946. Overall, there were 2,311 tanks produced. Unfortunately, at the beginning of its career, the IS-3 suffered from many serious problems related to design flaws. The most serious were: an unreliable engine, an extremely unreliable gear-box, and defective hull elements. Thus, in 1946, a special commission was formed which analyzed the deficiencies of the IS-3, and offered a Program of Modernisation and Improvement, also known as UKN (this abbreviation means "Ustranenie Konstruktivnykh Nedostatkov" - Fixing Construction Faults).

During 1948 to 1952, all of the tanks were modernised. The engine and gear-box were strengthened, and the construction of the main friction clutch and side gears was improved. The roadwheels were replaced with new ones. The 10-RK radio was replaced with the more modern 10-RT.

After all modifications, the weight of the IS-3 had increased to 48.8 tones. Despite all the changes and expenses of modernisation, the tank still had many deficiencies and remained unreliable.



The Czech production IS-3.

evaluation and instructor training. Probably, the Poles planned to accept the IS-3 for service in the future.

In 1950, one tank was sent to Czechoslovakia. China received many more tanks (they arrived after the Korean War). The Egyptian army received the first three IS-3's at the end of the 1950's. On June 23, 1956, IS-3's took part in a military "Independence Day" parade in Cairo, but most of Egypt's IS-3's were delivered from 1962 to 1967. The Israeli Army used captured IS-3's in the 1970's. The Israelis refitted the captured tanks' old V-54K-IS engines with more modern V-54's (taken from T-54's).



The ex-Egyptian IS-3M on military parade in Israel. 1967.

expensive modernisation programs.

At the end of the 1950's, the tank was modernised again and received a new designation: IS-3M. In fact, modernised tanks were more or less comparable with other Soviet and western tanks. Unfortunately, the IS-3 had had its day, and after the modernisation, all of the tanks were sent to storage areas and rarely used.

IS-3 tanks were exported in limited numbers. In 1946, two tanks were sent to the Polish Army for

In conclusion, I have to mention that the technical parameters of the IS-3 were superior to its predecessor - the IS-2. Western experts also counted the IS-3 as a very successful tank design. Many ideas which were introduced in the IS-3 were used in many other tanks, both Soviet and western (including the M48 "General Patton," the Leopard-1, etc.)

Unfortunately, the inherent drawbacks of the IS-3 weren't completely eradicated despite two

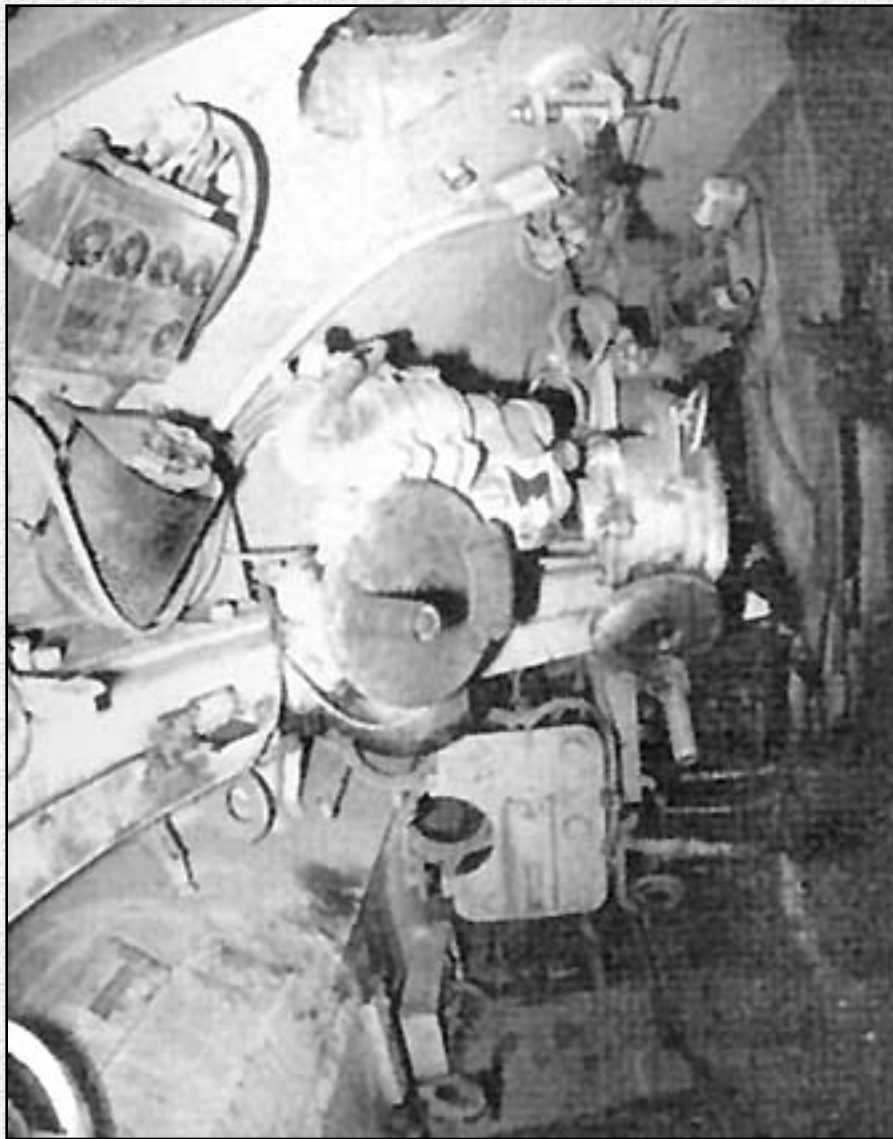


**The IS-3M on the tank show at Kubinka.
1998**

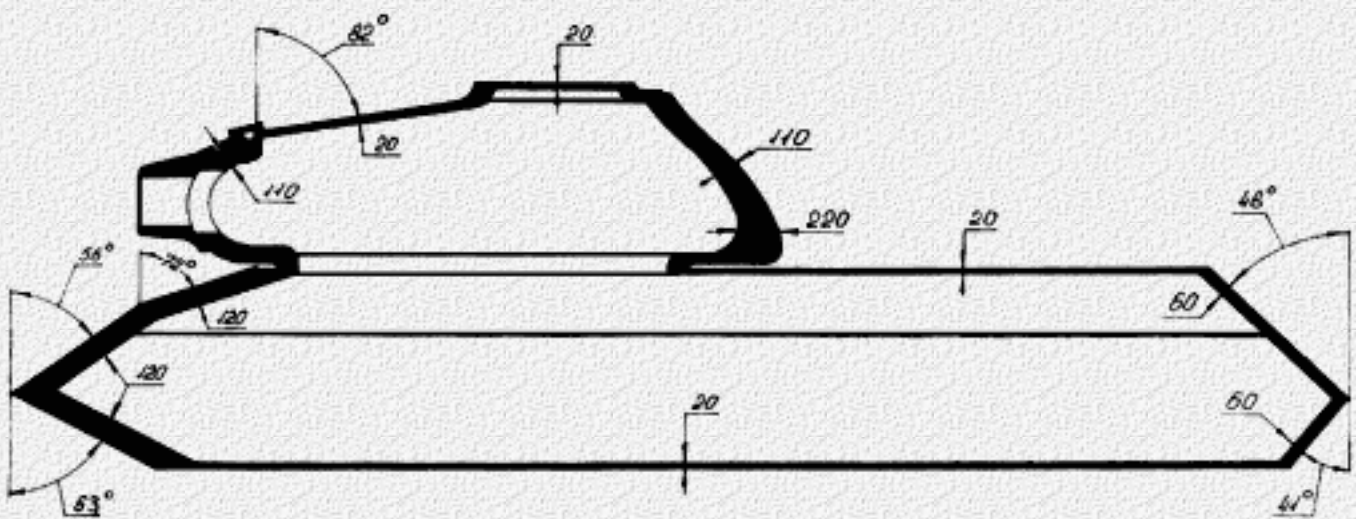
Today, there are many surviving IS-3M's displayed as memorials and monuments. Unfortunately, there is only a single 'pure' IS-3 that is displayed in a Kubinka Tank Museum.

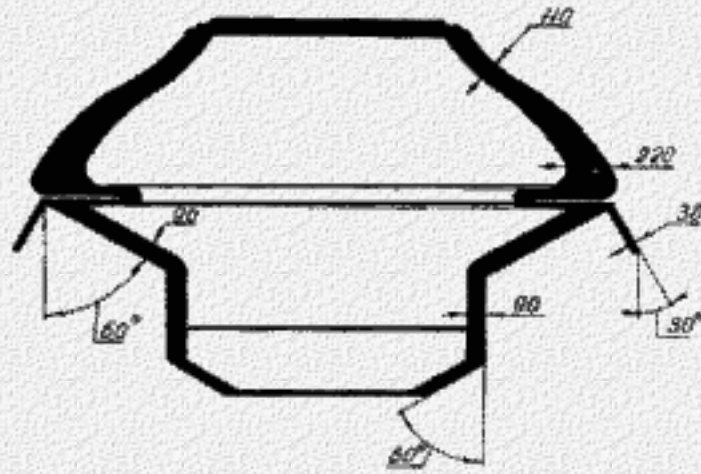


The Egyptian IS-3M. 4th Tank Division. 1967.



The turret: the gunner's station.





REFERENCES:

[Specification of Soviet tanks](#)

[Specifications of Soviet tank guns](#)

Proof-reader:

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Sources:

"About the works on modernisation of the heavy tank" NKTP, 1945

M.Svirin "The IS tanks", Armada #6, 1998

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Last Heavy Tanks of the USSR

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The IS-4



The six prototype of the IS-4 heavy tank named "Object 701-6".

In 1944, the development of the IS-4 heavy tank (factory designation: IS-4-701) began. It was an attempt to develop a heavy tank for the last period of World War II and for the post-war period.

The production version of the tank was preceded by several prototypes: "Object 701-2", "Object 701-5", and "Object 701-

6". These tanks were distinguished by their armament (type and caliber) as well as their armor protection. "Object 701-6" was the most successful, and in 1947 it was accepted for service under the IS-4 designation.



The production IS-4 heavy tank. 1947.



The IS-4 heavy tank.

One of the main features of the new tank was the layout of the ammunition: 30 multi-part loading (separate loading) rounds.

This ammunition was placed in special steel cartridges to protect them from accidental detonation and fire. Today it is widely believed that large-scale production of this tank started in 1947, but some production tanks may have been built in 1945-1946. In total, about 250 IS-4's were manufactured. Most of these tanks were sent to Far East units. In

1949, production was canceled and later these tanks were removed from service. That short operational life was due to:

- The weight of the tank exceeded the carrying capacity of most bridges and transport vehicles;
- Low reliability of the transmission;
- Below average tractability.

The IS-5



The wooden mockup of the IS-5.

This project began in 1944 in Factory #100 which was headed by J.Y.Kotin. There were several variants of this tank which were distinguished by differing armament, protection, and layout of the turret. The chassis was based on an existing project, but it also contained some original ideas. Only wooden scale-models of this tank were produced.

The IS-6



The IS-6 with the mechanical transmission during trials.

transmission such as on the IS-3. This tank received the "Object 252" designation. The chassis of "Object 252" consisted of big road wheels only (without support wheels). Later, Soviet designers chose the electro-mechanical transmission. The maximum speed of the 51.5-ton tank was 43 km/h.

The firepower of the IS-6 was equal to the IS-2, IS-3 or IS-4. Protection was better than the IS-2 or IS-3, but inferior to the IS-4.

In 1954, a new project was developed in Chelyabinsk, called "Object 253". It later received the "IS-6" designation. The main feature of the new tank was an electro-mechanical transmission. The chassis of the new tank was similar to the IS-2.

There was also a tank developed and produced with a mechanical



The IS-6 with the electric-mechanical transmission.

Use of the electro-mechanical transmission was expected to increase the maneuverability of the tank. Unfortunately, it did not due to the tank's heavy weight. The transmission was also of questionable reliability. The IS-6 with the purely mechanical transmission was even less reliable.

The IS-7



The wooden model (1:1) of the IS-7. 1946.

In 1945, Soviet designers started a new project: "Object 260" (IS-7). This tank was distinguished from the tanks of World War Two by many features. The hull of "Object 260" was made of sloped armor plates with rakish angles. Only a wooden mockup (1:1) was made.

In 1946, another variant was built. This variant had the same designation ("Object 260"). The

first prototype was finished on September 8, 1946, and passed running trials successfully. A second prototype was completed by December 25 of 1946 and also passed running trials (45km).

One of the main features of both prototypes were rubber-and-steel tracks. Such tracks were widely used by the Americans since World War II, but were previously rejected by Soviet designers. The tank was armed with a 130 mm S-26 gun with a new muzzle brake. Rate of fire was 6-8 shots per minute (very high considering the large calibre of the gun). The high rate of fire was due to a new automatic loading mechanism.



The prototype of the IS-7 heavy tank. 1948.



The prototype of the IS-7 heavy tank. 1948.

An Izhorsky factory manufactured two armored hulls and two turrets for the IS-7. They were tested at the Kubinka proving ground by gunfire from various guns of 88 mm, 122 mm and 128 mm calibres. The results were used for developing a final scheme of armor protection.

During 1947, Soviet designers worked on a project which was an improved variant of the IS-7. Both

hull and turret were redesigned and their armor protection was increased. The tank was rearmed with the newest 130 mm S-70 (L/54) gun. Another new feature was a system of fire control which allowed the gun to lock on a target and fire automatically.



The production IS-7 heavy tank.

In the summer of 1948, the Kirovskiy factory produced four IS-7 tanks. After they passed the factory trials, they were sent for Government trials. The armor protection of the IS-7 was almost invulnerable: the tank successfully withstood German 128 mm and Soviet 130 mm guns (the best guns of that time).

The IS-7 can be considered a masterpiece of Soviet tank development. It was far superior to all other tanks of the time. Having the weight of the "King Tiger" the IS-7 was far superior in protection and armament. The last surviving IS-7 is now displayed at Kubinka.

The T-10 (IS-8/IS-9)



The T-10M heavy tank. Soviet Armed Forces in DDR (Eastern Germany). 1970.



The first production T-10.

At the end of 1948, the GBTU (General Tank Directorate) issued an order to develop and produce a new heavy tank weighing no more than 50 tons. Work on the new "Object 730" was headed by J.Y.Kotin. That tank later received the "IS-8" designation.

A wooden mockup (1:1) was built and construction of the first prototype of the IS-8 began. After trials, the factory produced a small lot of 10 tanks, a testing

detachment. In the spring of 1950 at the Kubinka proving ground, these tanks were tested in government trials. Those trials were more or less successful and, as a result, a Government commission recommended the IS-8 for production, but only after a number of improvements were to be made.

The modifications were so numerous and significant that the project changed course many times. The tank was even renamed to the "IS-9", and then to the "IS-10". In March 1953, Stalin died and the abbreviation "IS" was obsolete. So the tank was renamed again, and it received the new "T-10" designation.



The T-10A on military parade. Red Square, Moscow. November 7, 1957.

("Object 730A").

In 1957, another modification, the T-10B ("Object 730B") was accepted into service. This tank was equipped with a 2-plane gun stabilizer, the PUOT-2 "Grom" and a T2S-29-14 sight.

Soon, a new 122 mm M-62-T2 (2A17) gun with improved ballistics was developed. This gun was equipped with a 2-plane stabilizer, the 2E12 "Liven" and a T2S-29-14 sight. The new tank ("Object 272") was also equipped with night vision devices. Under the designator T-10M the tank was accepted to service and put into production in 1957.



The T-10M heavy tank.

Army service.

The T-10 was armed with a 122 mm D-25TA gun and a coaxial 12.7 mm DShKM machine-gun (a modernised DShK). In 1955 the first two prototypes were produced: "Object 267 sp.1" with gun stabilization in the vertical plane and "Object 267 sp.2" with a 2-plane gun stabilizer. A year later these features were used in a subsequent version, the T-10A

In 1963 the T-10M was equipped with OPVT - a special system for underwater river crossings (up to 5 metres deep). From 1967, the tanks received APS and HEAT ammunition. The T-10 wasn't exported and was never used in military conflicts. In 1966, the manufacture of the T-10 was canceled. In 1993, the T-10 heavy tank was removed from Russian

The "Object 277"



"Object 277" during trials.

In 1957, "Object 277" was developed by J.Y.Kotin's design bureau. The new tank was based on ideas from the IS-7 and the T-10. "Object 277" was armed with a 130 mm M-65 gun and coaxial 14.5 mm KPVT machine-gun. The gun was equipped with a "Groza" 2-plane stabilizer and a night vision system. Ammunition consisted of 26 shells for the main

gun and 250 rounds for the machine-gun. The tank had a diesel engine of 1,090 hp.

The "Object 277" was equipped with an anti-nuclear defense system, a system of clearing the sights and a system for underwater river crossings. The crew consisted of four men, and the tank had good maneuverability. Two tanks were built in 1958.

The "Object 279"



The "Object 279" during trials. 1959-1960.

In 1957, a group of engineers, headed by L.S.Troyanov, developed a prototype of a new heavy tank, named "Object 279". This was a very unique vehicle. The tank had a classic layout, but the problem of protection was solved by an unusual design feature. The hull of the tank was

covered by a thin elliptical shield. That shield protected the tank against HEAT ammunition and to prevent it from overturning during a nuclear explosion.

The thickness of the glacis plate was 269 mm, and the thickness of the turret was 305 mm. The tank was armed with a 130 mm M-65 gun and a coaxial 14.5 mm KPVT machine-gun. The ammunition carried for the main gun was 24 shells. The Engine was a 16-cylinder diesel DG-1000 (950 hp) or 2DG-8M (1000 hp). The tank's crew consisted of four men.

Another unusual feature of the tank was the chassis. It consisted of four tracks combined in pairs. Such construction increased the tank's height, but guaranteed that the tank would rarely get bogged down. The tank also had great tractability on snowy

and swampy terrain. At the end of 1957, a single tank had been built, but after that the project was abandoned. The "Object 279" is now displayed at Kubinka.

The "Object 770"



The "Object 770" during trials.



The chassis of the "Object 770". Kubinka.

Unlike "Object 277", this tank was based on several unique ideas. The tank was equipped with a nuclear defence system, automatic fire-extinguisher system, night vision equipment, and semi-gyrocompass.

The thickness of the glacis plate was 120 mm, and the turret was 290 mm thick. Armament consisted of a 130 mm gun M-65 and one 14.5 mm machine-gun KPVT. The amount of ammunition carried for the main gun was 26 shells and 250 rounds were carried for the machine-gun. The engine was a 10-cylinder diesel DTN-10 (1000 hp) with a water-cooling system. The crew consisted of four men.

Having very good maneuverability, this tank was very easy to control. In a Soviet tank expert's opinion, "Object 770" was one of the most exemplary vehicles of the time. Today "Object 770" is displayed at Kubinka.

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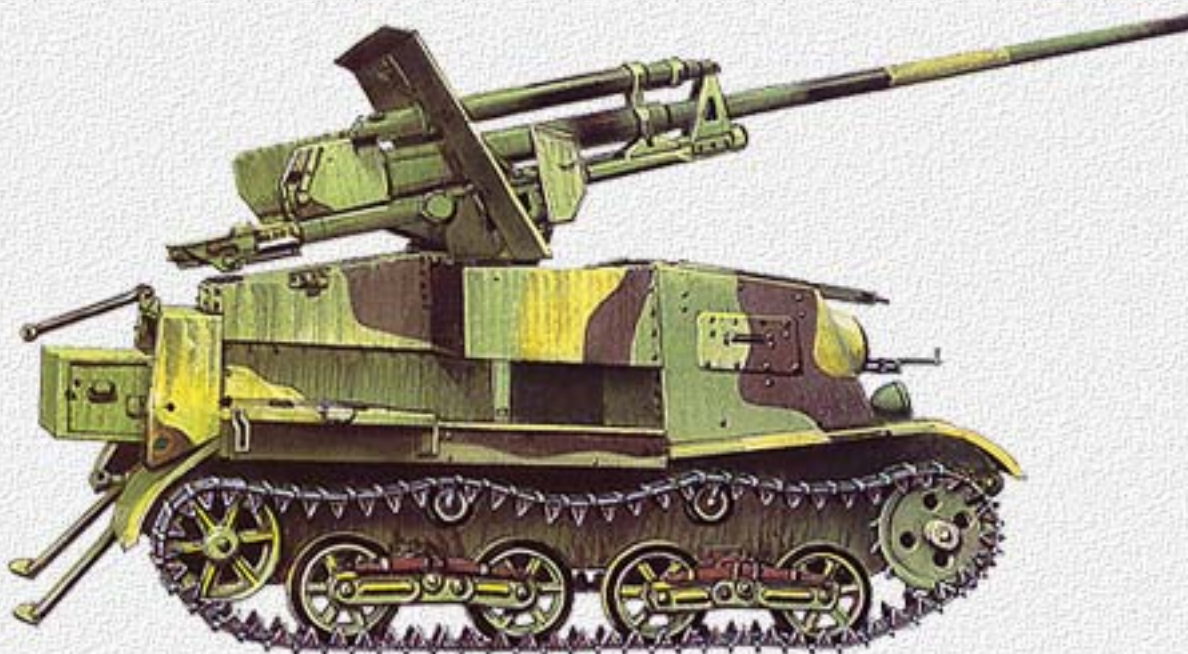
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The ZIS-30 Light Tank Destroyer

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At the beginning of the Great Patriotic War, the Red Army had no tank destroyer or SPAA in production. Before the war, several projects were developed; some of them were built. However all of those projects were abandoned later for various reasons. That's why, in July 1 of 1941, the Minister of Weapons signed an order to develop and produce a 37 mm SPAA, an 85 mm SPAA and a 57 mm TD. All projects were to be finished not later July 15, 1941. The development of a 57 mm TD was assigned to the Factory #92 in Gorky (today - Nizhnij Novgorod).



The "Komsomolets" armored artillery tractor.

To accomplish this task a special group of engineers was summoned to the factory's design bureau. The head designer was P.F.Murav'ev. In a very short time the new SP was designed and realized as a prototype.



It should be noted that two different prototypes were built: the ZIS-30 and ZIS-31. The ZIS-30 was a light tank destroyer based on the "Komsomolets" tractor. It was armed with an open [57 mm ZIS-2 AT-gun](#), protected only by the gun's shield. For better stability the TD was equipped with two extendable skids (you can see them at the rear of the vehicle in the photo below).

The ZIS-31 had the same armament but was based on an armored truck (GAZ-AAA). In July-August both TD's were tested. The tests showed better gunnery results for the ZIS-31. However the ZIS-30 showed better maneuverability in rough and swampy terrain, and was thus selected for service.

The Factory #92 was ordered to begin ZIS-30 production by September 1, 1941. However, a new problem appeared: at that time the only one factory produced the "Komsomolets" tractors - it was Moscow factory #37. However, in August 1941 this factory switched its production from tractors to tanks, so no factory in the USSR produced this type of tractor any more. Then the decision was made to collect tractors from Red Army's units. You can imagine the condition in which those tractors were received after their use in the Army! As a result the production of the ZIS-30 tank destroyer began on September 21 and continued up to October 15, 1941. During this period the factory #92 produced 101 TDs (including one experimental TD) with the 57 mm gun and one TD with a 45 mm AT-gun. Further production was cancelled because of a lack of tractors.



The ZIS-30 in action.

Battle for Moscow, November 1941.(RGAKFD)

The ZIS-30 tank destroyer served from the end of September 1941. Some of anti-tank batteries and 20 tank brigades of the Southwestern and Western Fronts were equipped with these TDs. Notice at that time this TD was called the "ZIS-2 57 mm AT-gun".

The new tank destroyer was very successful because of its excellent gun (in 1941-1942 this TD could penetrate any type of German tank from long distance). However, this TD still had several disadvantages:

- poor stability during firing (vehicle is jumping);
- overloaded chassis;
- low fuel capacity;
- low ammunition capacity;
- unprotected crew;
- lack of radio.

By the summer of 1942 most of these TD's were lost. Some were destroyed during battles, other were lost because of technical failures.



REFERENCES:

[Specification of Soviet tanks](#)

[Specifications of Soviet tank guns](#)

Sources:

"World War II", Quadrillion Publishing Ltd.

"M-Hobby" #4 1997

"Bronekolleksiya" #1 1998

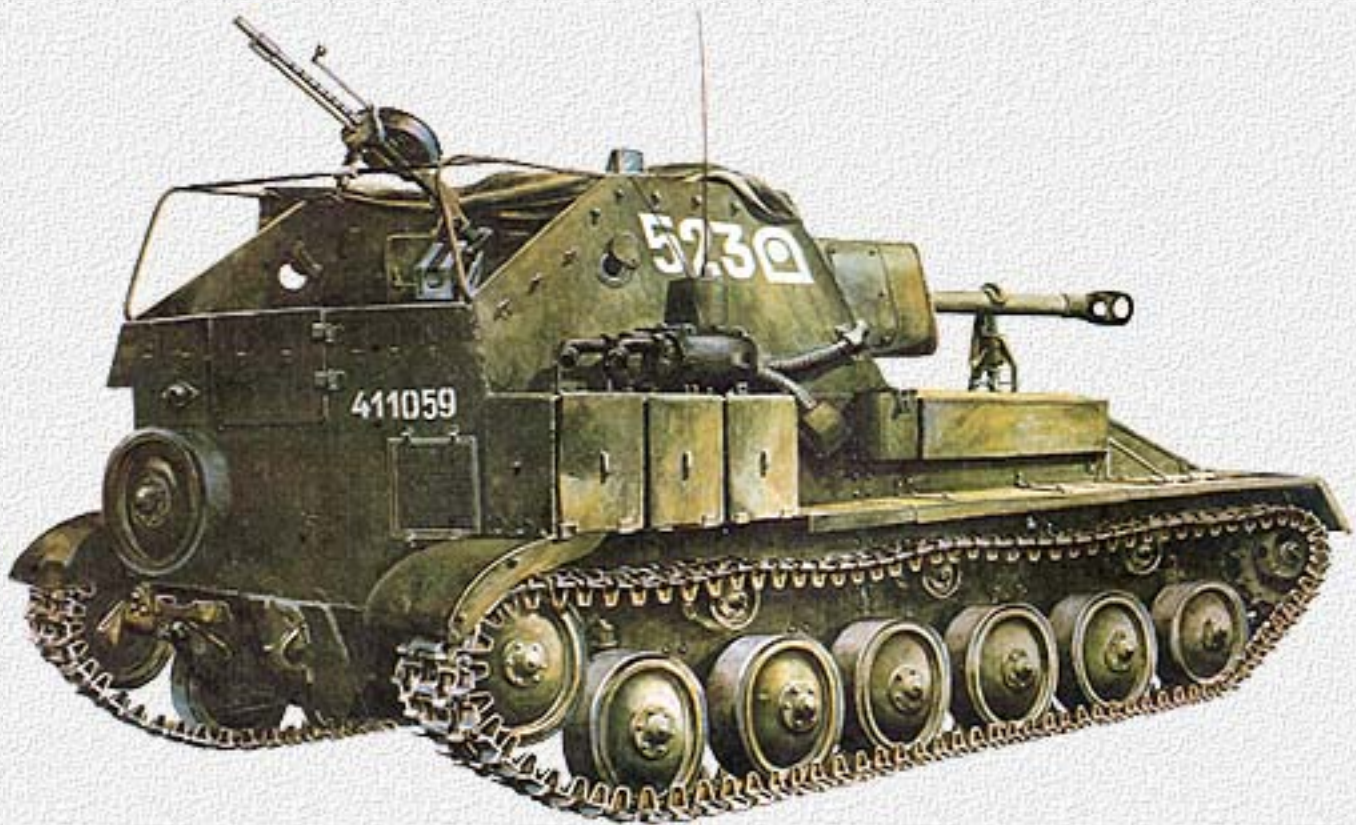
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Light Self-Propelled Guns of the SU-76 Series

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Introduction



When the Red Army entered the Second World War, the Soviet Union did not have any mass-produced self-propelled guns that could be used both for close support of the infantry and in an anti-tank role. In the late 1930's, a very limited number of SU-5 self-propelled guns was built based on the chassis of the [T-26](#) light tank, but they only had limited use during the occupation of Poland in

A pair of SU-76M are managing a street fighting. 1944. Note corpses of German soldiers on the road.

appeared so serious that in September of that year, the [ZIS-30](#) self-propelled gun was born as a stop-gap measure. Built on the chassis of the "Komsomolets" armored prime mover, this vehicle had a short range, had too much weight, and had poor stability, but it could reliably defeat anything that the Panzerwaffe had, which redeemed all of its shortcomings. In this way, the Red Army was provided with inexpensive self-propelled guns.

In the 1930's, there were some successful attempts at developing self-propelled assault and anti-aircraft guns on the chassis of the mass-produced T-26 light tank, which led to the manufacture of several experimental vehicles.

The SU-76P



The final assembling of the SU-76P. (M.Svirin)

1939.

By summer 1941, this lack of a suitable self-propelled gun

With the arrival of new tank models, the T-26s could theoretically be converted to self-propelled guns, but in reality, conversion was impossible due to great T-26 losses during the first months of the Great Patriotic War. It was also impossible to replace the T-26s with new tanks due to the fact that the tank factories were being evacuated to the Urals and to Siberia. However, in besieged Leningrad in 1941 to 1942, several small batches of SU-

76P were manufactured. The SU-76P consisted of a 76 mm regimental field gun installed on a T-26 chassis with a circular field of fire, and it had no protection for the crew other than the gun's shield. But this vehicle was merely another stop-gap measure, as the besieged city had to make do with whatever equipment it had remaining inside the encirclement.

In autumn 1941, all tanks armed with 45 mm guns which fought on the Leningrad Front become useless against "soft" targets like infantry due to the lack of fragmentation and high-explosive ammunition. That's why the General Staff of the Leningrad Front asked

the Ministry of Tank Industry (NKTP) to rearm existing BT and T-26 light tanks with the 76 mm KT Gun.

A new vehicle was developed and tested, and after successful testing, the General Staff of the Leningrad Front ordered Factory #174 to start manufacturing the new self-propelled guns. This vehicle received the SU-76 designation, and from 1943, it was renamed the SU-76P (P - "polkovaya" - "regimental") to avoid confusion with the new self-propelled gun which had the same designation (see below).

The OSA-76 (OSU-76)



The OSA-76 self-propelled gun. (M.Svirin)

The SU-76P alone could not solve the Red Army's lack of self-propelled guns, and there were attempts to utilise the chassis of T-60/T-70 tanks, which were mass-produced in 1941 to 1943. In autumn 1941, the GAZ Factory began, on its own initiative, the development of a light self-propelled gun designated the SU-71. However, it never entered full-scale production. By July 1942,

another self-propelled gun was developed: the OSA-76, which was based on the chassis of the T-60 tank.

That project was developed by an initiative of GAU, which involved the idea of installing all field artillery on self-propelled chassis. An "OSA" designation means "Obshevoiskovaya Samokhodhaya Artilleriya" (All-Purpose Self-Propelled Artillery). In fact, OSA does not belong to the SU-76 series, as it was rather an independent class of self-propelled guns. The whole OSA project resulted in the development of the following partially-armored vehicles:

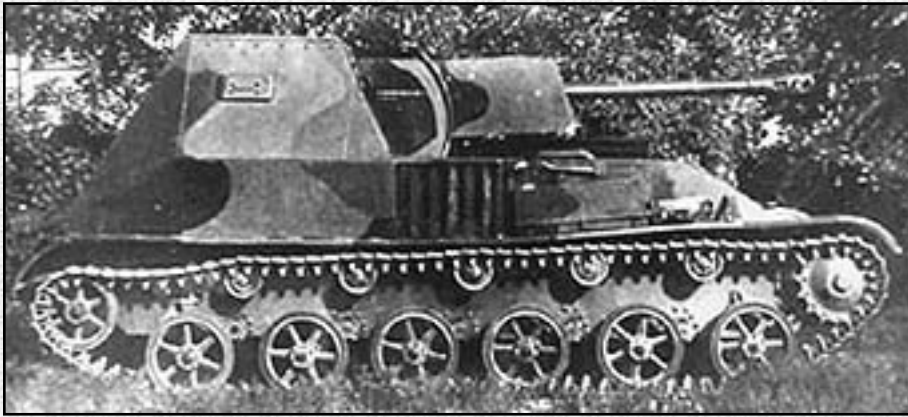
- the OSA-76 - a partially armored vehicle with a 76 mm self-propelled gun;
- the OSA-57 - a partially armored vehicle with a 57 mm self-propelled antitank gun;
- the OSA-23 - a partially armored vehicle with a 23 mm self-propelled antiaircraft gun;
- the OSA-12 - a partially armored vehicle with a 12.7 mm self-propelled antiaircraft gun.

The OSA-76 was armed with the 76.2 mm Assault Gun ZIS-3Sh based on the 76.2 mm Divisional Gun ZIS-3. The vehicle had a very low weight - less than 3,500 kg. The GAZ-MM gasoline engine powered it. The chassis of the OSA-76 was the same as on the T-60/T-70 light tanks. It had a crew of three men, and the armor protection was 6 mm. The

OSA-76 successfully passed all tests and was recommended for mass production, although it was ultimately never produced.

An attempt by Rumanian engineers to install a captured 76.2 mm F-22 gun on the chassis of a captured T-60 tank was more successful. Until the arrival of the German Pzkw IV Ausf G, they were the only means to reliably defeat Soviet medium and heavy tanks.

The Self-Propelled Gun of Factory #37



The experimental SPG of the factory #37.
(M.Svirin)

This was a self-propelled gun of the SU-76 series. The development of this vehicle followed the NKAP order of March 3, 1942. By May 1942, the first experimental prototype was manufactured and sent to the proving grounds. However, neither the chassis nor the armament passed the trials. The construction of this vehicle was based on the

chassis of T-60 light tank.

The SU-12 (SU-76)



The GAZ-71 inside the factory. (M.Svirin)

On October 19, 1942, the GKO issued Document #2429ss which ordered the GAZ Factory and Factory #38 to develop, to test, and to put into full-scale production a light SP gun, armed with the 76.2 mm Gun ZIS-3. The new vehicle was based on the chassis and engine of the T-70 tank, but with increased length, and an additional road wheel.

In November 1942, both factories

showed their prototypes. Both vehicles were armed with the ZIS-3Sh ("Sh" means "shturmovaya" or "assault") gun. The GAZ project was named the GAZ-71, and Factory #38's project was named the SU-12. On December 9, 1942, after comparative trials, the GAZ-71 was recognized as "not conforming to existing battle requirements," and was "very unreliable;" and thus, further work was cancelled. The SU-12, however, was accepted for service under the name "SU-76 Self-Propelled Assault Gun." From January 1, 1943, mass production began.



The SU-12 self-propelled gun. (M.Svirin)

The designers put the two GAZ-202 engines parallel to one another instead of in-line as on the T-70 tank. Its fully-enclosed shielding was welded from 10 to 35 mm armor plates, the driver's compartment was located in the front of the vehicle in between the engines, while the superstructure housing the ZIS-3Sh gun was located in the rear.

The crew of three also had a DT machine-gun and personal firearms at its disposal. By the end of January 1943, it formed the first two self-propelled artillery regiments sent to the Volkhov front.

The SU-76M (SU-12M)



Refueling the SU-76M. Winter 1943-1944.

The shortcoming of the parallel engine placement in the SU-76 (SU-12) became apparent when it resulted in transmission malfunctions. The malfunctions were due to torsional vibrations which led to rapid breakdowns. The vibration peaked in second gear, which was the most overloaded gear. It was impossible to properly synchronize the two engines.

As a result of the experiences in

the field, the production of SU-76 was halted on March 21st, 1943, after only 350 were produced. Due to the planned summer offensive, the GKO put a very strict time-frame to correct the defects. Already by May 17th, 1943, an updated SU-76M (SU-12M; M means "modernised") entered testing and by June of that year it entered production.



Soviet attack. Eastern Prussia. Spring 1945.

These vehicles had updated engines and transmissions, and used the old SU-76 hulls that were left over. Improvements included the introduction of spring clutches between the engines and the main gear, of a slipping clutch on the general shaft, and of engine shock absorbers. These items reduced, but did not eliminate, the likelihood of a malfunction. In May 1943, the

production of the SU-76M began. All of those vehicles took part in the Battle of Kursk.

The SU-15, the SU-16, and the SU-38



The SU-15 experimental SPG. (M.Svirin)

By summer 1943, the design bureaus of the GAZ factory and Factory #38 offered several independent projects on how to modernise the SU-76. GAZ offered the GAZ-74A project, which was to use the Soviet ZIS-16F or ZIS-80 diesel engines, or the American "Giberson" engine (of 110 hp). It was to be rearmed with the more modern 76.2 mm gun S-1, but the project was

abandoned, and only one experimental vehicle was built.

Factory #38 simultaneously offered three different projects: the SU-15, the SU-16, and the SU-38. All these vehicles were to be armed with the 76.2 mm Gun S-15, and they were powered by the GAZ-203 engine (like the T-70 light tank).

The SU-15 was based on the chassis and hull of the SU-12, and was powered by two

GAZ-203 engines, and with the slightly improved air-filtering system. The compartment (superstructure) was slightly widened.



The SU-16 experimental SPG. *(M.Svirin)*

However, this vehicle was much lighter than the SU-16. It had an all-around protected compartment at the front of the tank (like the SU-152, etc). It was engineered to distribute the load evenly along the chassis.

The engine, the transmission, and the chassis of the SU-16 was originally taken from the T-70 light tank. However, the protection was increased with 45 mm armor on the front. The compartment was armor-protected from the top and rear as well.

Like the SU-16, the SU-38 self-propelled guns had the chassis and engine taken from the T-70.



The SU-38 experimental SPG. *(M.Svirin)*

Comparative trials were performed during the summer of 1943. They showed that the SU-16 was the most successful, but had a poor crew layout. The chassis of both the SU-15 and the SU-38 were overloaded, which led to rapid breakdowns. Nevertheless, the SU-15 was chosen and recommended for mass production after a weight decrease.

The SU-15M (SU-76)



The SU-15M self-propelled gun. (M.Svirin)

While producing the SU-76, the GAZ factory started a modernisation program for the SU-15, as all the critical parts of that vehicle (engine, chassis, transmission, etc) were produced there. The modernised self-propelled gun (factory designation SU-15M) was distinguished from its predecessor by the unprotected compartment from the top and rear. It was powered by two GAZ-

202 engines with a common cooling system and transmission.

In August 1943, that SPG successfully passed all trials, and was accepted for service under the SU-76 designation. From October 1, 1943, the mass production of this vehicle began.

The SU-76 in Action



By June 1945, the total production of the SU-76 reached 14,292 - approximately 60% of the total volume of all self-propelled guns produced during the war. It was manufactured in the following factories: Factory #30 in Kirov, Factory #40 in Mytishchi, and the GAZ Factory in Gorkij.

The updated version was delivered to the Army on time, but it left a questionable impression on its crews, and received nicknames such as "Suka" (Bitch) or "Golozhopij Ferdinand" (Naked Ass Ferdinand). Tankers who never fought in the SU-76, but who had judged it from the outside gave such unpleasant nicknames. Tankers who fought in the SU-76 called it "Colombina," which was a somewhat affectionate name. The first negative

The battle in suburbs of Branderburg. Spring 1945.

impressions of the vehicle were formed when they were pressed into service as tanks. The first SU-76s were sent to mixed self-propelled artillery regiments and in the summer of 1943, each unit was supposed to have 21 vehicles (four batteries of five vehicles each and one commander's SU-76). Only with time came the realization that the main task of the SU-76 should be close support of the infantry. The task of fighting enemy tanks was left to more powerful artillery systems based on the chassis of the [T-34](#) and the [IS-2](#) tanks. As a result, by the end of 1944, SU-76s were placed into light self-propelled artillery batteries of sixteen vehicles each, which were then part of regular infantry divisions.

Naturally, among the sixty shots that a SU-76 carried, some were armor-piercing. However, its main advantages were its low profile, high mobility, and low ground pressure (0.545 kg/cm²) which allowed it to operate in the marshy and forested areas which had poor ground conditions, in close cooperation with the attacking infantry, and in firing directly at pillboxes and fortified buildings.



**The SU-76 "Smelij". Transbaikal Front.
August 1945.**

Further use of the vehicle in street battles at the end of the war uncovered another disadvantage of the system - the semi-open superstructure of the vehicle, which was roomy and excellent for crew movement, became a mass grave for its crew in case of an infantry grenade explosion. On the other hand, the opened compartment made all types of high-explosive anti-tank (HEAT) ammunition (including weapons such as the "Panzerfaust," the

"Faustpatron," and the "Panzerschreck") totally ineffective.

The first batch of SU-76s (25 vehicles) was delivered by January 1st, 1943, and was sent to the self-propelled artillery training school. At the end of January, the first two mixed self-propelled artillery regiments (the 1433rd and the 1434th) were sent to the Volkhov front to assist in the relief of Leningrad, and in March 1943, two more regiments (the 1485th and the 1487th) were formed, and fought on the Western front.



In 1943, a light self-propelled artillery regiment had a full complement of 21 SU-76M. At the end of 1944 to the beginning of 1945, seventy batteries of self-propelled artillery (consisting of sixteen vehicles in each battery) were formed and attached to rifle divisions. In the first half of 1944, light self-propelled artillery brigades of the Reserve of High Command (RGK) were formed,

and consisted of sixty SU-76M and five T-70s each.

By the end of the war, the Red Army had 119 light self-propelled artillery regiments and seven self-propelled artillery brigades. The Polish army received 130 SU-76M. The SU-76M was used in the design of the ZSU-37 self-propelled anti-aircraft gun, which was armed with a 37 mm automatic anti-aircraft gun. It was manufactured at Factory #40 in Mytishchi, but it did not see action in World War Two. A total of 75 units were manufactured in 1945 to 1946.

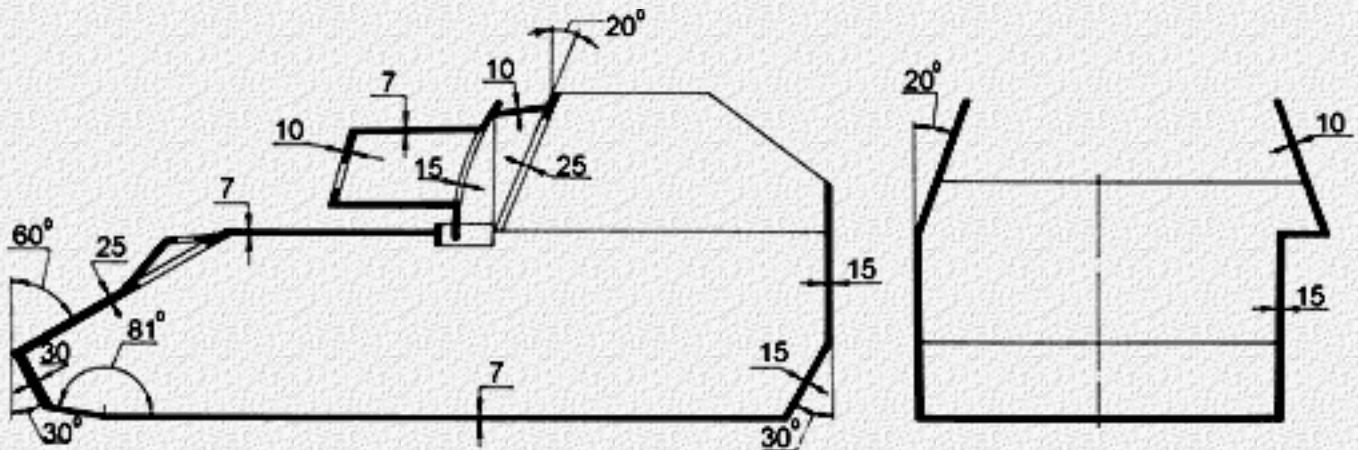


The active service of the SU-76M did not end with the Second World War. The Soviet Army continued to use it through the early 1950's. The 130 vehicles given to the Polish Army were also taken out of service in the mid 1950's. A few dozen SU-76M that North Korea received saw action in the Korean war from which almost none survived.

The story of SU-76 would not be complete without an account of

further attempts to modernise it. In December 1943, a SU-74B tank destroyer with a ZIS-2 anti-tank gun was tested, as was a GAZ-75 with an 85 mm D-5-S85A gun in 1944. It had the same 85 mm gun as the SU-85, but it had half its weight and its frontal armor was twice as thick (the SU-85 had 45 mm, and the GAZ-75 had 90 mm of frontal armor). None of those designs ever entered mass production, the main reason being a reluctance to disrupt the production of existing designs for the benefit of only minor

improvements, as in the case of new engines, or to completely rework the manufacturing process for a new model.



REFERENCES:

"Colombina" - memoirs of the SU-76's crewmember

Specification of Soviet tanks

Specifications of Soviet tank guns

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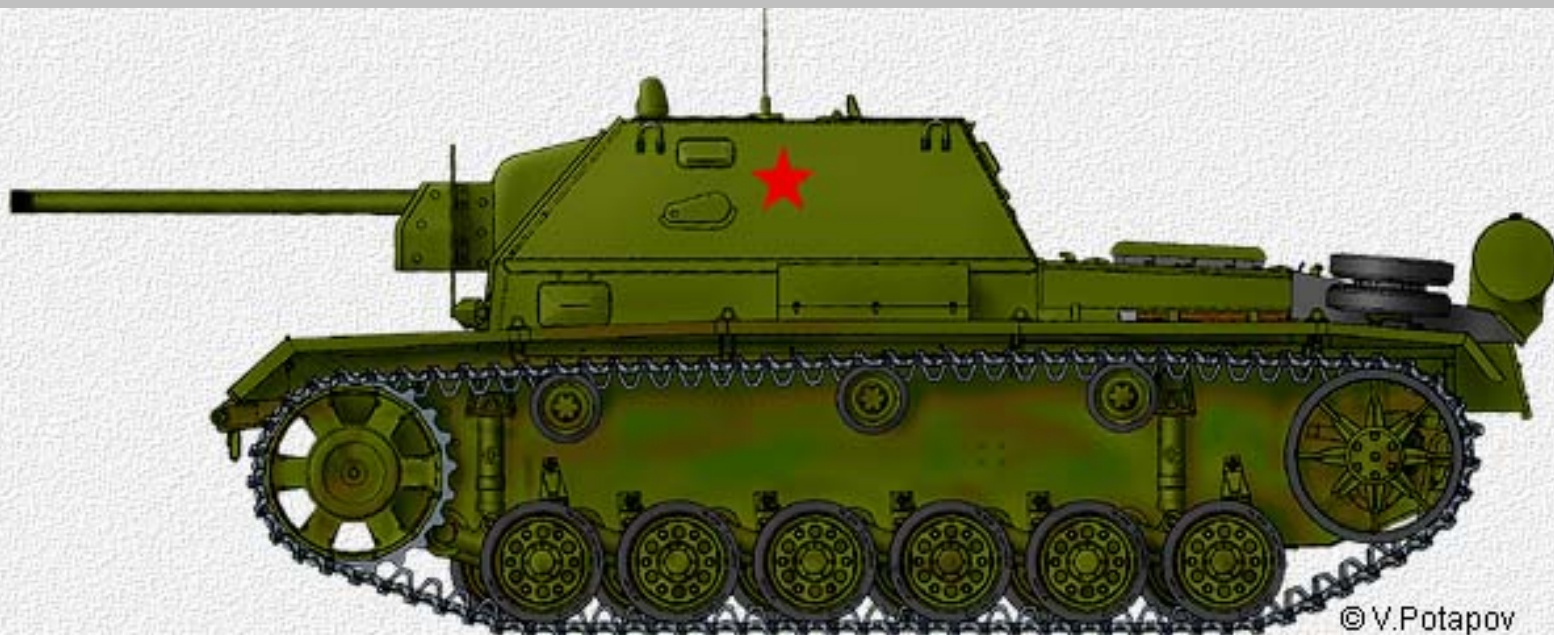
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The SU-76i Assault Gun

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Prototype of the SU-76i on trials. March 1943.

(M.Kolomiets)

The first attempts to re-arm captured self-propelled guns with domestic weapons were conducted in Moscow factories in the fall of 1941 to the beginning of 1942. According to A. Klubnev's memoirs, in March 1942, when he was the commander of a platoon of T-60 tanks (33rd Army), six repaired StuG III's arrived. Three of them were armed with the original StuK gun, while "the three other vehicles were armed with early production T-34

guns" (probably the 76.2 mm Tank Gun L-11). P. Minkov also fought in the 33rd Army, and he described the same vehicle that "was armed with the gun of the KV tank." He mentioned this vehicle was knocked out at Medyn' in the spring of 1942.

Unfortunately, I was unable to find any documented proof of such vehicles (neither photos nor documents). I suppose it was an isolated instance, and they were not production vehicles.

In January and February 1943, most newly-accepted SU-76's (SU-12's) had to be repaired because of many mechanical failures, and therefore the Red Army was deprived of important vehicles. The situation had to be improved immediately, before the beginning of the 1943 Summer Offensive. I. Kashtanov proposed to rearm the SG-122 with the divisional 76.2 mm cannon (the original SG-122 was based on the chassis of the captured German Pz-III and armed with the 122 mm Howitzer M-30). This was a good proposal since the USSR possessed more than 300 ex-German tanks, which were captured after the Battle at Stalingrad. Kashtanov's project was accepted on February 3, 1943, and there was little time to finish the project, as it had to be accomplished prior to March 1, 1943.



The trials of the SU-76i. Sverdlovsk. March 1943.

(M.Kolomiets)

Kashtanov and some other engineers moved to Factory #37 in Sverdlovsk, where they continued their work to re-arm the SG-122. Initially, they planned to mount the 76.2 mm cannon ZiS-3Sh on a pedestal fitted on the floor. Unfortunately, this plan did not provide reliable protection from bullets and shell fragments.

The problem was solved by using the 76.2 mm Tank

Gun S-1. This weapon was designed specially for self-propelled guns, it was based on the F-34 Tank Gun, and was very cheap. The S-1 was distinguished from the original F-34 by a framework that allowed it to be easily mount directly on the frontal armor plate (i.e. without an additional pedestal).

On February 15, 1943, S. Ginzburg reported to the minister of the NKTP that "... Factory #37 started manufacture of the experimental 76 mm self-propelled gun S-1." On March 6, the SP-gun was finished and sent to factory trials.



The prototype of the SU-76i. Sverdlovsk. March 1943. *(M.Kolomiets)*

These trials were conducted in the Sverdlovsk area, and consisted of racing on snow (off-road) and on ice-covered roads. Despite cold temperatures (-35° C) the vehicle successfully passed all trials and on March 20, 1943, it was recommended for service under the SU S-1 designation. (I have also seen the designations: "SU-76 (S-1)" and "SU-76i" where the "i" suffix means "inostrannaya"- foreign).

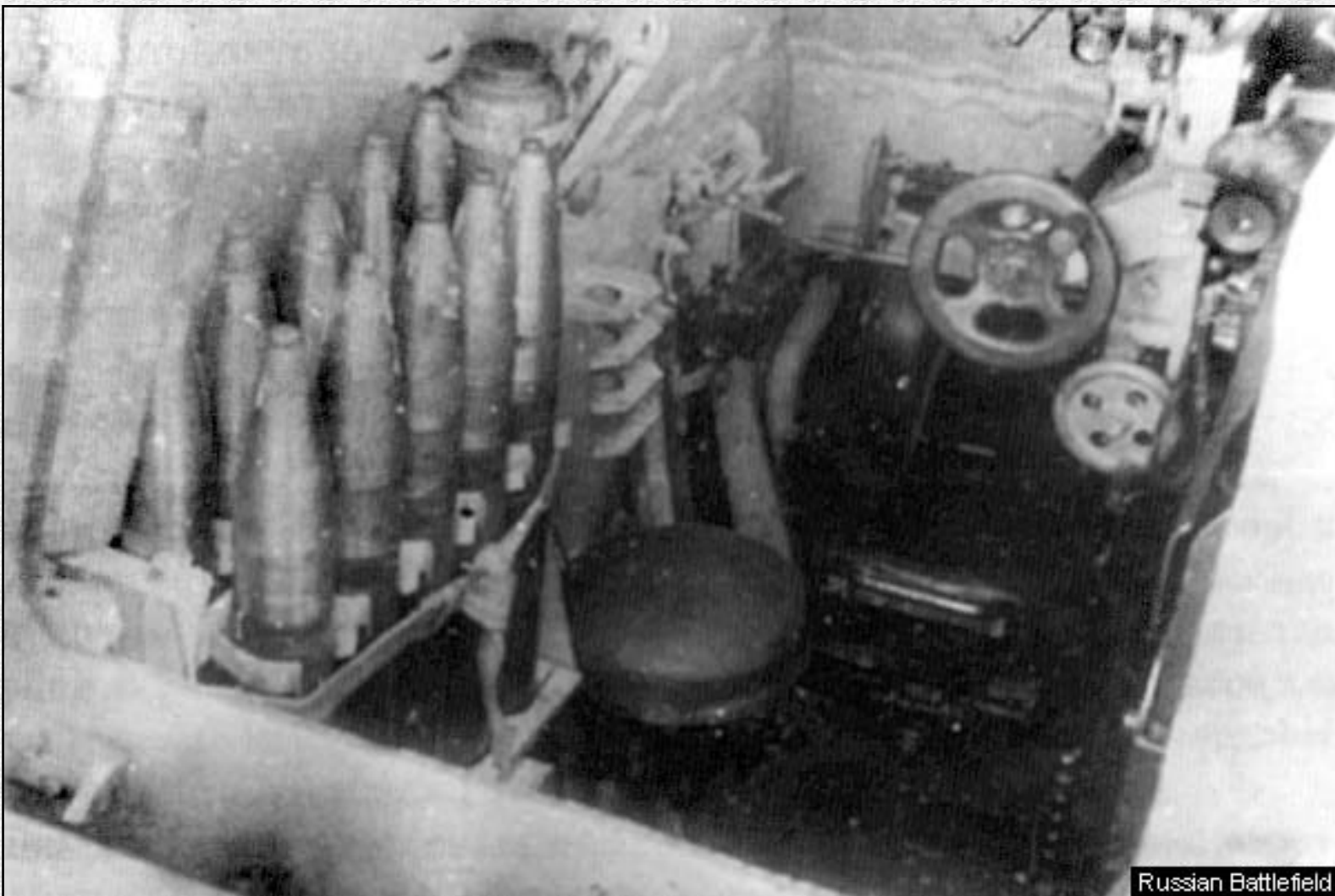
On April 3, 1943, the first five production SU-76i had been sent to the Training Self-Propelled Regiment, that was located in Sverdlovsk area. In one month of intensive operation, these vehicles ran 600 to 700 kilometres and helped to train over 100 new tankers. All the tankers liked the new SP-guns but mentioned problems starting the engine while frozen: to start a frozen engine, they poured burning petrol in it (this is not a joke!).



Interior view from the rear hatch on the battle compartment of the SU-76i. You can see the breech-block of the gun and the commander's station. *(I.Moshanskiy)*

At that time, the factory launched production of the new 20 SU-76i, which were sent to the training units. From May 1943, the SU-76i appeared on the front lines.

The first vehicles looked very spartan. Their battle compartment was of welded 35-mm armored plates on the front, 25-mm plates on the sides, and 15-mm on the rear. Initially, the roof was made of a single armored plate and fitted with bolts. Despite what some modern tank "experts" state, the absence of a roof is not an obvious disadvantage of any AFV - many Soviet crews removed the vehicle's roof to make the vehicle more habitable.



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Interior view from the rear hatch on the battle compartment of the SU-76i. You can see the gunner's station and the driver's station. *(I.Moshanskiy)*

In the beginning 1943, because of a shortage of radios, a radio was installed on every third vehicle. From May 1943, almost every SU-76i was equipped with the 9-R radio.

In July-August 1943, after the experience gained from the Battle of Kursk, an additional armored shield was fitted on the gun. This shield was intended to protect the gun from jamming from shell fragments and bullets. Simultaneously, the SU-76i began to be equipped with two external fuel tanks.

The first SU-76i's were equipped with the original German commander's cupolas taken from captured PzKpfw-III's. In August 1943, a decision to produce some commander version of the SU-76i's was accepted. Each commander SU-76i was equipped with a commander's cupola and a radio of extra range. Such vehicles had reduced ammunition load.

The last SU-76i left the factory gates in November 1943. By that time, the problems with domestic SU-76 were fixed and they put into mass production, and the SU-76i was no longer needed. The Soviet SU-76 was much cheaper to manufacture, easier to maintain,



The commander SU-76i with the commander's cupola borrowed from the Pz-III. Factory #37. June 1943. (M.Kolomiets)

and much easier to supply with spare parts. In total, Factory #37 manufactured 181 SU-76i plus 20 commander SU-76i.

SU-76i's first saw Battle at Kursk. In the beginning of July 1943, the 13th Army of the Central Front possessed sixteen SU-76i. During the defensive stage of the battle, eight vehicles were lost, three of which were burnt-out. The Voronezh Front also had

some SU-76i, but unfortunately they only reported the total number of all 76-mm self-propelled guns - 33 vehicles.

It is also known that during the advance on Orel, the Central Front was reinforced with two SAPs (SAP means Self-Propelled Artillery Regiment). One of these regiments had 16 SU-76i and one PzKpfw III.



The production SU-76i. Kubinka. (M.Svirin)

On August 2, 1943, the 5th Guards Army was reinforced with the 1902nd SAP, which had 15 SU-76i. Before August 14, the regiment didn't fight, but was repairing its SU's and awaited trucks (initially there were only 10% of the needed trucks in the regiment). At that time, the regiment also received five SU-122's. From August 14 to 31, the regiment was

engaged in five battles. The regiment destroyed two tanks, nine cannons, twelve machine-guns and over 250 men. According to the 1902nd Regiment Commander's report:

"...every vehicle has some damage. Some vehicles were recovered several times, all vehicles based on PzKpfw-III are depreciated and now in very poor

condition. The regiment was constantly under-equipped, but the experience for the personnel was quite good."

In September 1943, the regiment participated in fourteen battles, in every battle, the regiment used from two to seven self-propelled guns simultaneously. The most effective battles occurred from 20 to 23 September of 1943, when six SU-76i's pursued the Germans and destroyed three tanks. Usually, during pursuit or attack, self-propelled guns followed the Soviet tanks. The commander stated "...if tanks and SP-guns could be used on a more massive scale, losses could be reduced significantly." The regiment fought until November. On November 25, 1943, the 1902nd SAP was sent as reinforcements since it lost all its vehicles.

In addition to the 1902d SAP, SU-76i's were in the 1901st and 1903rd SAPs, which also fought in August and September during the Belgorod-Khar'kov offensive operations.



Production SU-76i with the gun shield and external fuel tanks. (M.Svirin)

Finally, during the Kursk Battle, some Soviet self-propelled artillery regiments used captured German self-propelled guns. For example, on August 10, the 1938th SAP of the 7th Guards Army had two SU-122, two SU-76 (SU-12), and two SU-75 (StuG III).

Soviet tankers liked the SU-76i because it wasn't as cramped as the SU-85, SU-122, or the captured StuG 40. Only one serious disadvantage was mentioned: the vehicle had only one hatch (by 1943, German tanks with side hatches almost completely disappeared), so there was a problem with escaping the vehicle if it was burning.

Quite interesting evidence about the SU-76i was found in German reconnaissance reports. On October 25, 1943, the Staff of the German 1st Panzer Army written a report to the directorate "Foreign armies - East":

"In the 177th Panzer Regiment of the 64th Mechanized Brigade* there are four companies of eleven tanks in each. These tanks are named "Sturmgeschutz 76 mm." They are based on the chassis of the German Panzer III with the Maybach engine. The new battle compartment has 3-4 cm armor thickness on the front;

1-1.5 cm on the sides. The battle compartment is opened from the top. The gun has horizontal angle $+15^\circ$ and vertical angle $\pm 7^\circ$."

* The 64th Mechanized Brigade was attached to the 7th Mechanized Corps of the Red Army.

This report is quite confusing. At first, the report is obviously describing the SU-76i. On the other hand, self-propelled guns could not be assigned to a tank regiment of the mechanized brigade. Most probably, the report is about the SAP - self-propelled artillery regiment, but in this case, the total number of the SP-guns is doubled anyway, since each SAP had 22 vehicles.

From August 1943, Kashtanov's design bureau attempted to rearm the SU-76i. On September 14, 1943, the Chief Engineer of Factory #37 received a letter from Frezerov (Chief of the Tech Department of the NKTP):

"Your new project to mount the 85 mm gun D-5-S-85 onto the chassis of the PzKpfw III (the SU-85i) cannot be realized because of a shortage of 85-mm guns and an unclear situation with Pz-III tanks.

I think this project must be cancelled, but all documents must be saved for later possible usage."



SU-76i in museum on Poklonnaya Hill in Moscow. (V.Potapov)



SU-76i in museum on Poklonnaya Hill in Moscow.
(V.Potapov)

This project ended all attempts to use chassis of captured tanks for Soviet tanks and SP-guns. In the beginning of 1944, Fedorenko (Chief of the GABTU) issued an order to transfer all existing SU-76i from combat units to training units.

In training units these vehicles were used until the end of 1945, and after that they were written off. In Kubinka, one working SU-76i was used for a very long time and was written off in 1968. Today, only two SU-76i remain. The first one was

accidentally found and

recovered from Sluch River and now it is displayed as a monument in Sarny (Ukraine). The second one was discovered by "Ekipazh" Searching Group and now it is displayed in museum on Poklonnaya Hill in Moscow.

Proof-reader:

[Mark Jaremco](#)

Sources:

"Trphies in the Red Army", Frontovaya Illustratsiya #1, 2000;

M.Kolomiets, M.Svirin "Kurskaya Duga", ExPrint NV, 1998;

"Poligon" #1, 2000.

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The SU-85 Tank Destroyer

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The SU-85 tank destroyer of the 3rd Ukrainian Front. Rumania, August 1944.



The SU-85-I. (M.Baryatinsky)

When the first German "Tiger" was captured at Leningrad in January 1943, the Soviet High Command was shocked. Its armor was too thick for most Soviet guns. The most common Soviet tank gun, the F-34 (installed in the [T-34-76](#)) and the ZIS-5 (installed in the [KV-1](#)) could penetrate it only from suicidal distances.

Special ballistic tests showed that the M-30 howitzer (mounted on a SU-122 assault gun) wasn't effective against the Tiger. Using the HEAT ammunition, M-30 was able to penetrate the Tiger's armor, but slow rate of fire and curved trajectory (don't forget that M-30 was a howitzer, not a field gun) made SU-122 as a quite easy target.

A special tests revealed that the two most effective guns against the Tiger's armor were the 85 mm AA-gun and the 122 mm A-19 corps cannon. So, Petrov's design bureau was ordered to develop a new tank destroyer - an 85 mm gun that would be mounted on

an [SU-122](#) chassis which had been designed by L.Gorlitsky.



The SU-85-IV. *(M.Svirin)*

That is why, by the GKO order from May 5, 1943, a F.F.Petrov's design bureau has started works on adapting the 85 mm AA gun model 1939 for further rearm with it SU-122. Simultaneously, the TsAKB (a design bureau lead by V.Grabin) has started their works on rearming SU-122 with already existed 85 mm

S-18 gun. Initially, that has been developed for KV heavy tanks. A slightly improved, with new gun mantlet and new gun-cradle, S-18 was delivered to the Uralmash.

However the attempt to install it in the standard compartment of SU-122 was failed because of too big breech end of the gun. Uralmash tried to reject all further works cause it led to modernisation of a whole hull, thus it led to a big expenses. However it was forced to continue works. As a result, two different vehicles have been built.

The first one - the SU-85-I - had a standard hull of the SU-122, but had the new gun-cradle and the new gun mantlet. The initially proposed coaxial machine-gun was later removed because of lack of room.



Armored column crossing the Dnestr river with an SU-85 tank destroyer in the lead. The river is littered with abandoned German equipment, including a Sd Kfz 250 APC and derelict 3-ton half-track.

The second one - the SU-85-IV - was based on the SU-122 as well, but had a modified front. Both self-propelled guns were armed with the 85 mm Tank Gun S-18.

As I said above, simultaneously the works on S-18, works on installing the Petrov's 85 mm D-5S gun into to SU-122 have been conducted. Initially, D-5S was considered as a temporal step until the problems with S-18 will be solved. However, on a comparative trials, D-5S showed the same ballistic but better performance and reliability.

Nevertheless the successfully passed trials, the existed gun-cradle didn't allow to add a telescopic sight. Thus, a new sight TSh-15 has been developed. The new self-propelled

gun was named SU-85-II.

Comparative trials proved the superiority of the SU-85-II over the SU-85-I. The SU-85-IV was removed from trials earlier because of some serious defects. SU-85-II was accepted for service as a "self-propelled antitank gun SU-85".

The SU-85 had 48 rounds for its gun, in addition it had 1500 rounds for the crew's sub-machine guns, 24 grenades F-1 ("pineapple") and 5 antitank grenades. The transmission, engine and most of other components were left unchanged (the same as in the [T-34/76](#)), allowing easy transition for new crews.



The destroyed SU-85 investigated by German soldiers. Central Poland, summer 1944.

The first batch TD's were equipped with an armored commander's cap. Later it was replaced by the standard commander's cupola - the same as on the T-34/76 model 1943. Besides, crew could use a prismatic observation sights installed in left side

and rear. On later vehicles the some additional optic was installed which made an almost all-round observation.

In the front and the sides there were embrasures for firing with small firearms. These embrasures might be closed with a conic spigots. Basically, SU-85 was similar to SU-122 excluding its armament.



The SU-85 from the Polish 13th Regiment of Assault Guns in late April 1945.

In September 1943, during the Dnieper crossing, there was the very first usage of SU-85's. This TD become a very popular in the Red Army due to its powerful gun that was able to penetrate German Tigers and Panthers from a quite long distances. For example, in 1944, during the summer offensive, the 1021st Self-Propelled Artillery Regiment (1st Baltic Front) destroyed over 100 German tanks. Another example,

taken from a commander's report of the 1st Guards Tank Army):

"During all phases of the battle, the new tank destroyers played a key role in supporting our armored attack. New TD's were very effective against enemy tanks. They had of good armor protection and their guns could kill targets at great distances. In addition, new TD's proved to be very effective in defensive."



A SU-85 from Polish 13th Regiment of Assault Guns in Germany in 1945. The slogan on the wall says "Polish soldiers advance on Berlin".

With the advent of the deadlier [SU-100](#) tank destroyer, the production of SU-85's was canceled. Sum totally, 2329 SU-85's and 315 SU-85M's were built.

The SU-85 saw service beyond the Red Army: 70 SU-85's served in the Polish Army (Voisko Polskoye) and 2 vehicles served in the Czech Corps.

Because of problems with with 100 mm AP ammunition, the mass production of the SU-100 was delayed. At the same time, the SU-85 was already removed from production (from July 1944).



A column of SU-85M tank destroyers marching through snow-capped forest in Eastern Prussia. January 1945.



The SU-85BM. (*M.Svirin*)

Thus, a temporal step was made: a SU-100 tank destroyer armed with an 85 mm D-5S was developed and set up in the mass production. That "temporal" variant received SU-85M designation. It distinguished from common SU-85 by thicker frontal armor (75 mm instead of 45 mm) and by spacious compartment. It produced until December 1944, when the production of SU-100 was launched.

Besides of the production SU-85s and the SU-85Ms, there were several experimental vehicles which didn't accept by various reasons.

In autumn 1943, after the long and detailed investigating of the German heavy tank destroyers "Ferdinand", GAU ordered some design bureaus to develop a new more powerful antitank gun which would be able to fight with German heavy tanks and TDs. As an example it was suggested to use German 8.8cm PaK 43.

One of the first project was offered by F.F.Petrov's design bureau. A redesigned D-5 gun - which was designated D-5S-85BM - had longer barrel. Using a standard 85 mm rounds and increased powder propellant charge, the muzzle velocity of AP round was increased up to 950 m/s. At the same time, new gun allowed to use a standard ammunition as well. Gun was installed in the hull of the standard SU-85. New TD was named SU-85BM ("BM" means "bol'shaya mosh'nost" - of special power). From January to March 1944 it was tested on a proving ground. By its results, SU-85BM was not accepted for service.



The SU-D-10-85. *(M.Svirin)*

Notwithstanding the previous attempt, in autumn 1944 Petrov's design bureau offered another variant of 85 mm gun: a 100 mm B-34 which was re-bored to the 85 mm caliber. New gun was named D-10-85PM and tank destroyer - SU-D-10-85. It used a standard 85 mm rounds and 100 mm cartridges. In summer 1944, the new TD was tested but didn't accepted for service.



The SU-S-34-1. *(M.Svirin)*

Besides of Petrov's design bureau, the Grabin's design bureau was involved. In spring 1944, it developed a new tank destroyer SU-S-34-1 armed with 85 mm S-34-IB gun. It had an unusual ammunition: a 85 mm round with a 100 mm cartridge. In summer 1944, the new TD was tested but didn't accepted for service.



The SU-85M tank destroyer.

REFERENCES:

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The SU-100 Tank Destroyer

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By the middle 1944, it became clear that existing Soviet antitank weapons were insufficient for successful combat with the newest German tanks. It was needed to increase the firepower of the Soviet tanks and antitank guns.

Question was solved by developing a new self-propelled gun armed with a very powerful 100 mm gun with ballistic, similar to the B-34 Naval Gun. By December 1943, all drafts of the further vehicle were sent to the Ministry of the Tank Industry (NKTP) and, simultaneously, to the Department of the Self-Propelled Artillery. On December 28, 1943, the NKTP ordered the Uralmash (the "Uralmash" means "Uralsky Machine-Building Plant") to arm the new vehicle with the 100 mm gun:

"1. By 15.01.44, a new medium tank destroyer on base of the T-34 must be



The SU-100 in the Balaton operation. (RGAKFD)

developed and being armed with the 100 mm S-34 tank gun;

2. By 20.02.44, to build and test that vehicle. Not later then 25.01.44, the tank gun must being received from the factory #92;

3. Not later then 25.02.44, send the new vehicle to the Governmental trials."

Yes, the terms of this order were very demanding. After the line-drawings of the S-34 gun had been obtained, it became clear that this weapon could not be mounted on the tank destroyer, due to the width of the gun which made an unacceptable limitation on traverse and did not allow room for the driver's hatch on the front of the hull. However, the modification

could not be achieved in any case within the time-frame of the order.

That entailed the changes in constructions of welding and assembling benches. It was need also to use a torsion bar suspension, move on 100 mm left the driver's station and all the controls, to broaden the whole compartment which would increase the weight on 3.5 tones. However, the TsAKB (Central Artillery design bureau) took uncompromising position and was persisting to install its S-34 gun.



The SU-100 Tank Destroyer in Prague in May

The "Uralmash" asked design bureau of Factory #9 to develop a new 100 mm Tank Gun, and work (led by F.F.Petrov) was finished by middle 1944. The new gun was based on the 100 mm B-34 Naval Gun. In fact, the basic model of the new gun was named D-10, while it's tank variant named D-10T and it's SP gun variant named D-10S. Of course, the D-10S and D-10T had the same ballistic and had only a

1945. The wartime SU-100 lacked the large stowage fitted to post-war vehicles as is evident in this view.

minor differences concerning their mounts. To be precise, I must say that the first time those guns did

not distinguished in documents and all of them named simply D-10. The additional "T" and "S" letters appeared later, somewhere in 1950's.

The D-10 was lighter than the S-34 and could be installed in existing hull without any serious alterations. On March 3, 1944, the very first prototype with the D-10S passed a local program of tests on the "Uralsmash" factory which consisted of 30 shots and 150-km race.

After that, the vehicle was sent to the Governmental trials, which took place near Gorokhovets town. From 9 to 27 March of 1944, vehicle being tested. During those tests it fired 1040 shots and run a 864-km race. New vehicle was named SU-100 and recommended for mass manufacturing after some minor improvements must be done. On April 14, 1944, the "Uralsmash" was ordered to begin a mass production of the SU-100. The TsAKB however, demanded (again!) to arm the vehicle with its S-34 gun. After a long and heated debates, the GKO ordered the TsAKB to modify existing variant of the S-34 to reduce its wide dimensions and, after that, mount it in the SU-100. All those works were done by the factory #9.



A couple of SU-100 tank destroyers of the 384th Guards Heavy Assault Regiment of the 7th Guard Tank Corps enters Landsberg, Silesia during the Sandomierz-Silesia offensive by the 1st Ukrainian Front on January 21, 1945. The January offensive was the first time that the SU-100 tank destroyers were committed.

Those works were pointed to shorten the gun-cradle on 160 mm, to make a new pivots, to make a new traversing mechanism and to do some other improvements.

New modification of the vehicle received the SU-100-2 designation. From 24 to 28 June, 1944, both vehicles (SU-100 and SU-100-2) were tested. After 923 shots and 250-km race SU-100-2 was recognized as worse and did not recommend for further development and production. The SU-100 was recognized as successful and "its tactical and technical characteristics allow it to hit any modern AFV at ranges of:
- 1500 metres both Panther and

Tiger when hit any part of those tanks;
- 2000 metres for Fedrinand's sides"*

*Source: The Order #6131. July 3, 1944

The SU-100 was similar to the [T-34](#) and [SU-85](#). The hull was taken from the SU-85, its frontal armor was increased from 45 mm to 75 mm. Because of this, the first pair of road wheels being overloaded, so the diameter of their springs was increased from 30 mm to 34 mm. That helped a little but anyway, the first road wheels remained overload. That was noticed by all tankers who fought on SU-100.



A column of SU-100's during Military Parade on the Red Square, Moscow.

A new commander's cupola was installed on the roof as well as MK-IV observation sights, also a pair of the new ventilators were mounted to combat with asphyxiating powder gases. Generally, the 72% of the SU-100's parts were borrowed from original T-34, 4% taken from the [SU-122](#), 7.5% - from SU-85 and only 16.5% parts were new. The 100 mm long barreled (56 clb) D-10S gun was supplied by 18 armor piercing rounds BR-412B and by 15 fragmentation/HE rounds OF-412.

Having a 895 m/s muzzle velocity, the BR-412B with a blunt ballistic cap was able to penetrate ~100 mm armor sloped at 60° at range of 1500 metres.

Notwithstanding, there were a known problems with the D-10S, its fine tuning continued till the summer 1944. Moreover, there were large problems with mass production of the BR-412B, the technological process was too complex and final production was of low quality resulting a reduced armor penetration. Thus, the mass production of the SU-100 was delayed until problems with ammunition won't be solved. They were resolved by November-December 1944. Until that date, the mass production of the [SU-85M](#) was launched instead. In December 1944, the manufacturing of the Su-85M was cancelled and mass production of the SU-100 was started instead.

Having an excellent firepower and maneuverable, this tank destroyer was able to penetrate a frontal armor of any German AFV from a quite long range. Its AP shell could penetrate 125 mm vertical armor from 2000 metres, while from distance of 1000 metre it could penetrate most of German AFVs through. In spite of many guessings, SU-100 didn't have any HEAT or sub-caliber ammunition. These ammo were developed after the end of war.



The incorrectly rebuilt SU-100.

The SU-100 had a "classical" scheme. At the front there was a combat compartment with the D-10S mounted in it; at the rear - the engine's and the transmission compartment, the last consisted of the friction clutch, the five-speed gearbox and two side friction clutches. Plus, two fuel tanks and pair of air filters were located in the transmission compartment. Total capacity of all internal fuel tanks was 400 liters that provided the Su-

100 with 310 km range. Tank controls, armament, ammunition, radio, and frontal fuel tanks were set up in the combat compartment. The SU-100's driving gear was totally borrowed from the T-34.

The D-10S gun was equipped with two sights: the telescopic and the panoramic. Ammunition consisted of 33 cartridge loading shots. The gun's mantlet was fastened by eight bolts. The practical rate of fire was about 5-6 shots per minute.

From December 1944, mass production of SU-100 begun. Till the autumn 1945, UZTM has manufactured 2495 of SU-100's.

In summer 1944, the experimental self-propelled gun ESU-100 was developed. It had an electric transmission. Due to some reasons ESU-100's project was abandoned (mostly due to low reliability). The mass production of the SU-100 continued to March 1946. Some sources claims that in 1947 the production of SU-100 was resumed and additional 198 vehicles were manufactured. In 1950th SU-100's were manufacturing in Czechoslovakia after the USSR's license.

From December 1944, some Soviet regiments and



The SU-100 Tank Destroyer.

brigades of the medium self-propelled artillery being rearmed with SU-100's. Each of that regiments consisted of four batteries of 5 vehicles plus one commander's SU-100 or T-34 per battery. A self-artillery brigade consisted of 65 SU-100's. On January 8, 1945, SU-100's were used for the first time (that was in Hungary). The mass usage of the SU-100s was during infamous German counter-offensive at Balaton lake (Hungary, March 1945). In other places SU-100s used occasionally. Till the end of war, total 3037 SU-100's were built. Th SU-100 served in USSR up to the end of 1970's, in most of Eastern countries (members of Warsaw Pact), in Asia, Africa and Latin America. This vehicle took part in military conflicts on Middle East, in Angola etc.



The SU-122P

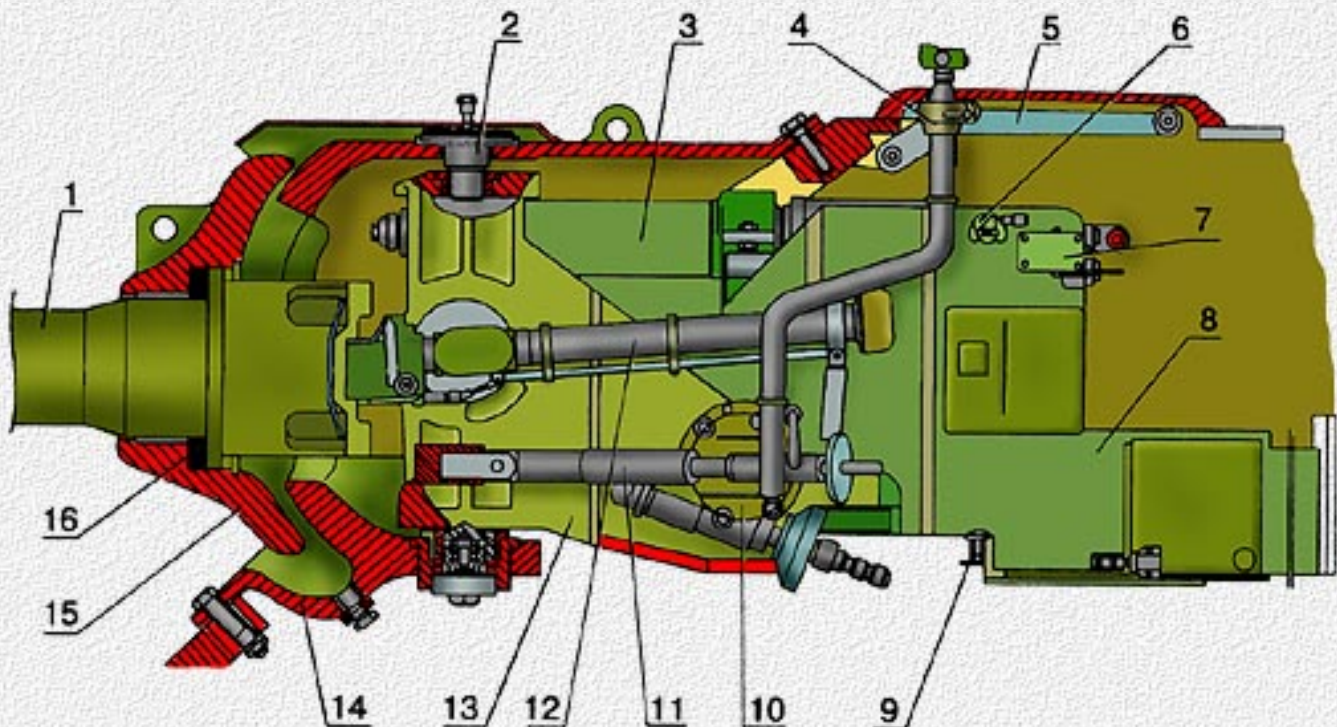


The SU-122P. (*M.Baryatinsky*)

In autumn 1944, due to delaying the mass production of the SU-100, the Uralmash's Design Bureau offered a project of a tank destroyer based on the SU-100. Like the SU-85M, this vehicle was the common SU-100 but armed with a 122 mm Tank Gun D-25S. Such modernisation was possible due to unified fastening of both guns.

The very first trials of the SU-122P conducted in October 1944, after

that the vehicle was sent to the Governmental trials which were passed as well. By the results of both trials, the SU-122P was recommended for service, but it didn't mostly because of slow rate of fire.



The 100 mm Tank Gun D-10S

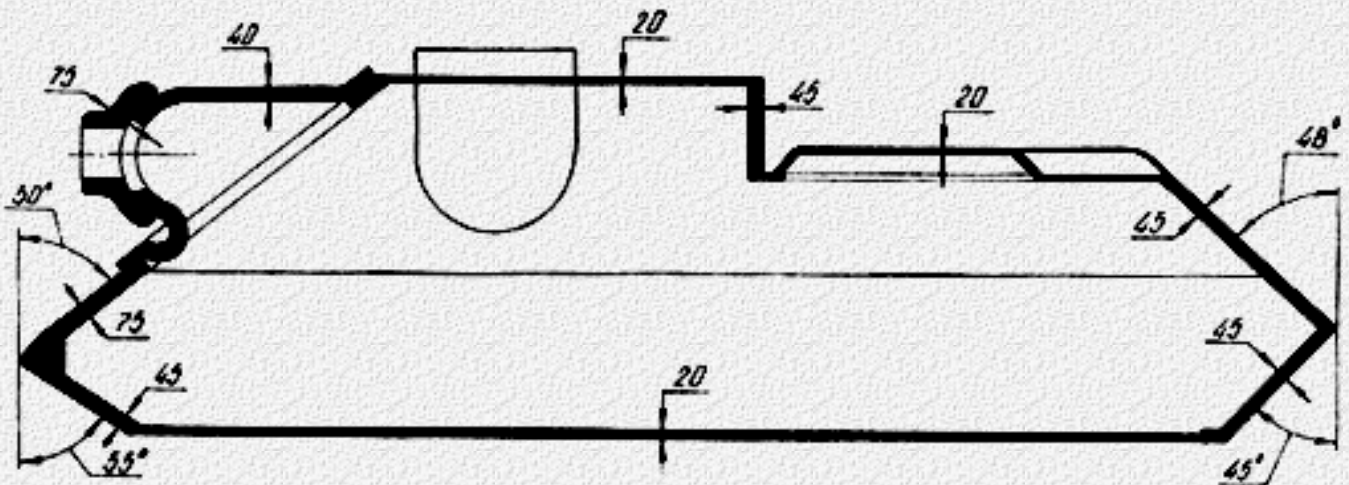
1. The barrel;
2. The upper journal;
3. The recoil brake;
4. The Hertz panorama;
5. The gun's holder;
6. The elevation level;
7. The electric block detent;
8. The protection;
9. The firing lever;
10. The elevation mechanism;
11. The traversing mechanism;
12. The TSh-19 sight;
13. The frame;
14. The casing of a chassis;
15. The gun's mantlet;
16. The shock-absorber.

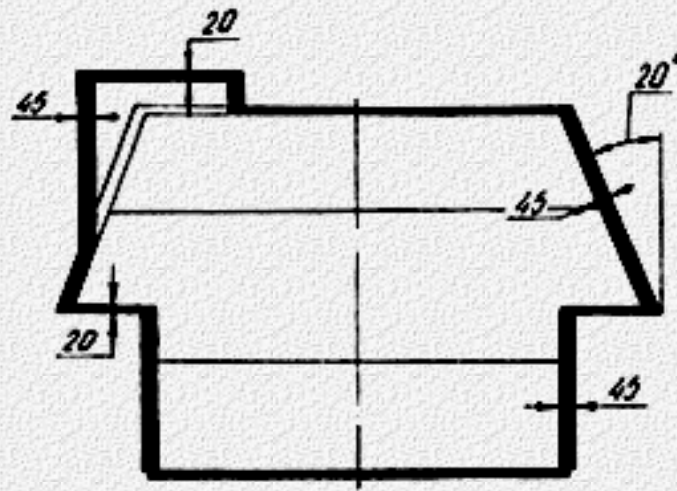


The UOF-412 round with the High-Explosive Fragmentation Projectile OF-412



The SU-100 Tank Destroyer





REFERENCES:

[Specification of Soviet tanks](#)

[Specifications of Soviet tank guns](#)

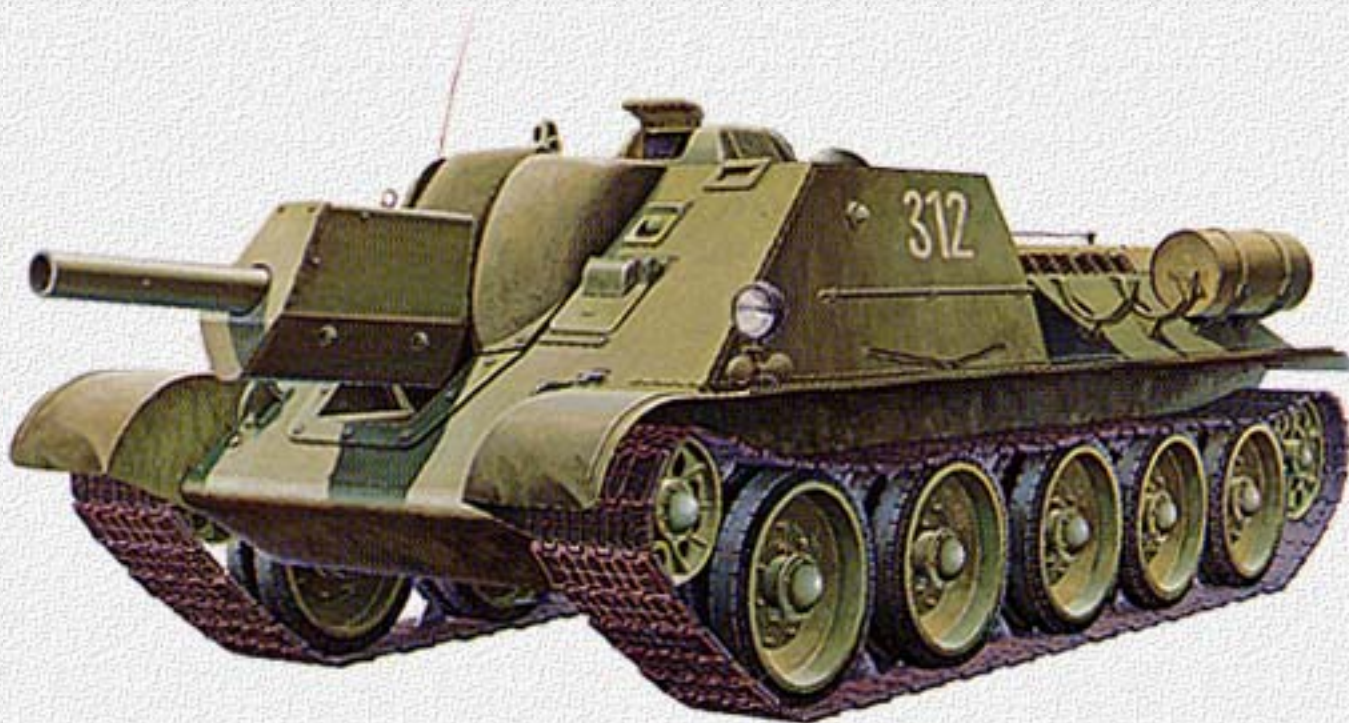
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The SU-122 Assault Gun

◀ [MAIN MENU](#) [SOLDIERS AT](#)

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The SU-122 assault gun. Kursk, July 1943.

The success of the German StuG's did raise a big interest within the Soviet High Command. Assault guns were cheaper to produce, because of the absence of a turret and some other expensive elements. The larger compartment offered more room, so bigger and more powerful weapons could be installed in it. Because of the absence of a heavy turret, the vehicle's frontal armor could be increased as well.

In April 1942, the GAU ordered several design bureaus to develop an assault guns with 122 mm armament or even greater. All work was coordinated by the Ministry of Tank Industry (Russian



Before attack. Kursk, July 1943.

abbreviation - NKTP). Each bureau did offer it's own project. Two of these projects were manufactured "in metal". The first of them (U-35 designation) was developed by the Uralmash (Uralsky Machine-Building factory). The second was the [SG-122\(A\) Self-Propelled Gun](#), which was developed by the Factory #592.

The U-35 was a fully armored assault gun, armed with the 122

mm M-30 howitzer, mounted in non-traversing compartments. The vehicle was based on the chassis of the T-34 medium tank. The SG-122 was armed with the same howitzer but was based on the chassis of an ex-German StuG III. In July 1942, the SG-122 was accepted for service, but was considered unsuccessful and hard to maintenance, so it was quickly removed from service.

The U-35 was protected with 45 mm of frontal armor. The elevation angles of the M-30 were -3° $+26^{\circ}$, the horizontal (traversing) angle $\pm 10^{\circ}$. Engine and transmission were left unchanged to increase the production capability and keep the cost price low. The maximum range of the vehicle was increased by adding some external fuel tanks.

The crew of five men was placed as follows: driver's station at the left front hull, gunner's station at the left behind the driver, commander's station was at the right front and the two loaders (the M-30 loaded separately) were behind the howitzer's breech.

In December 1942, after passing a full set of tests, the GKO ordered to manufacture a small installation party of SU-35 assault guns. Later on the vehicle was renamed SU-122. Till the end of 1942, a total of 25 assault guns were manufactured.

The same month, the first mixed regiment was formed, partially equipped with these SP-guns. The regiment consisted of four batteries of [SU-76s](#) SP-guns (16+1 vehicles in total) and two batteries of SU-122s (eight vehicles total). At



**The SU-122 in action. Probably
Kursk, July 1943.**

to deal with enemy AFV's at long distances successfully.

Although, even without any hollow-charge ammunition, the SU-122 could deal with heavy German tanks, including Tigers. This is a quotation from the original report written by Major Gomille, commander of the III.(Tiger) Abteilung/Panzer Regiment (Panzer-Division Grossdeutschland):

the end of January 1943, a pair of SU-122 regiments were put into action near Leningrad. In March 1943, another two SU-122 regiments were formed and sent to the front.

The impression of the new regiments was different. Although the appearance of a new assault guns was met with delight, the use of SU-76's together with SU-122's caused many problems because of certain technical troubles with the SU-76.

After they were improved, all SU-76's were re-organized in separate regiments of light self-propelled artillery, while SU-122's were used to form medium self-propelled artillery regiments. These Medium SP regiments consisted of 16 SU-122's (organized in four batteries) and one commander's T-34 tank. Soon, the new SU-122 became very popular due to it's quite powerful armament and good armor protection. In May 1943, the new BP-460A HEAT round was accepted. That ammunition allowed the SU-122

"...Hauptmann von
Villerbois,
commander of the
10.Kompanie, was
severely wounded
during this action.
His Tiger was hit
eight times by 12.2
cm shells from the



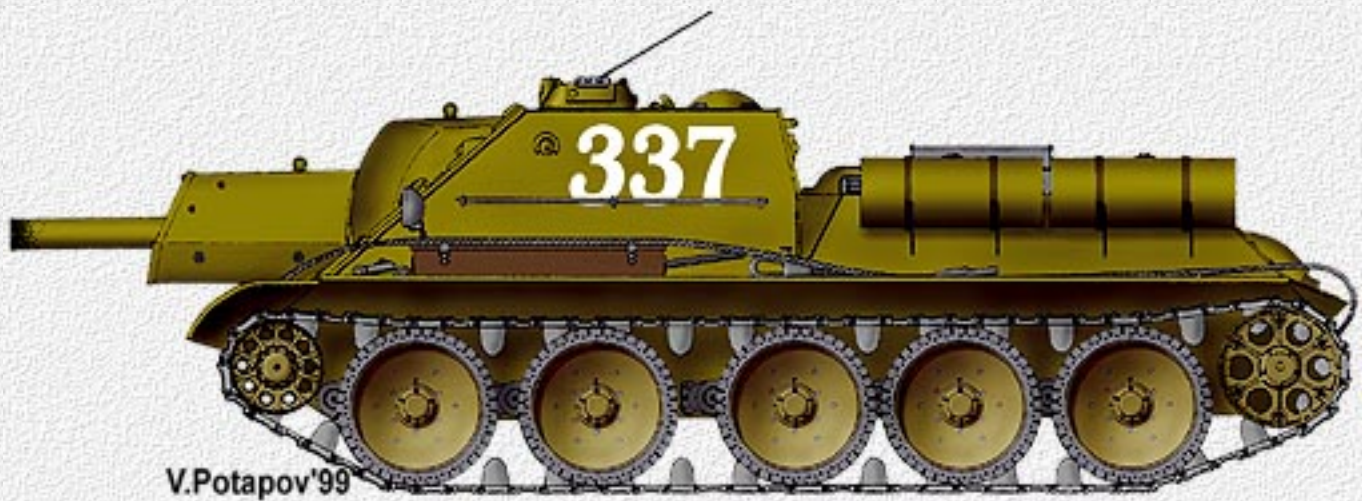
The SU-122 is going to battle. Prokhorovka, 14 July 1943.

assault guns on T-34 chassis. One hit penetrated the hull side. The turret was hit six times, three of which resulted only in small dents, while two hits caused fractures and small pieces to break off. The six hit broke out a large

piece (about two hand widths) from the turret armor that flew into the fighting compartment. The entire electrical firing circuit for the main gun was knocked out by the hits and several vision blocks were destroyed or broke out of the weak holders. The weld seam on the hull was sprung open for about 50 cm from the location of the penetration, so that it wasn't possible for the Werkstatt-Kompanie (maintenance company - Valera) to repair it".

The report was written on August 31, 1943. Obviously, this report is about SU-122s as they were single "assault guns based on T-34 chassis" at the time. The SU-85 and SU-100 appeared much later.

Simultaneously with mass production, works on improvement of the existing SU-122 continued. In general, they were pointed at the reduction of production expenses.



The SU-122 Medium Assault Gun.



Nevertheless, in March 1943, the Uralmash offered a project of drastic modernisation of the SU-122. The new variant did receive the SU-122M designation. It had a new compartment, in which the 122 mm U-11 howitzer was mounted. That howitzer had passed the comparative trials together with the KV-9 experimental tank. One of the two loaders was excluded from the crew due to the improved aiming mechanism.



The SU-122M. (M.Svirin)

The U-11 howitzer has supplied with the same ammunition as the M-30 Howitzer. The driver's hatch-stopper was replaced with a tip-up hatch. The governmental trials of the SU-122M did reveal many defects and serious drawbacks in it's design. The reliability of the vehicle was also far from perfect, it's chassis was overloaded. The cost price was very high. Because of this, SU-122M wasn't accepted

for service.



The SU-122-3 on the trials. *(M.Svirin)*

In spite of that rebuff, Uralmash did offer another variant of modernisation. It was based on the new concept of total unification of basic elements and parts of Soviet tanks. The projected assault gun was highly unified with the [SU-85](#). Its hull was redesigned, the 85 mm D-5T was replaced with the 122 mm D-6 howitzer, which was more compact than U-11 but with the same ballistics and ammunition. The gun's mantlet did not alter.



The SU-122 advancing on Kharkov. August 1943.

The new vehicle was named SU-122-3. It was sent to comparative trials together with some other modernised SU-85 SP-guns. Notwithstanding the negative experience of SU-122M, the new vehicle was very unreliable. It didn't pass the trials, and wasn't accepted for service. All further work was cancelled. Later in 1944, a small number of SU-122's were based on the SU-100 chassis, however that modification

wasn't put in mass production.

The manufacturing of the SU-122 continued up to summer 1944. Totally 1100 of them were manufactured.

REFERENCES:

[Specification of Soviet tanks](#)

[Specifications of Soviet tank guns](#)

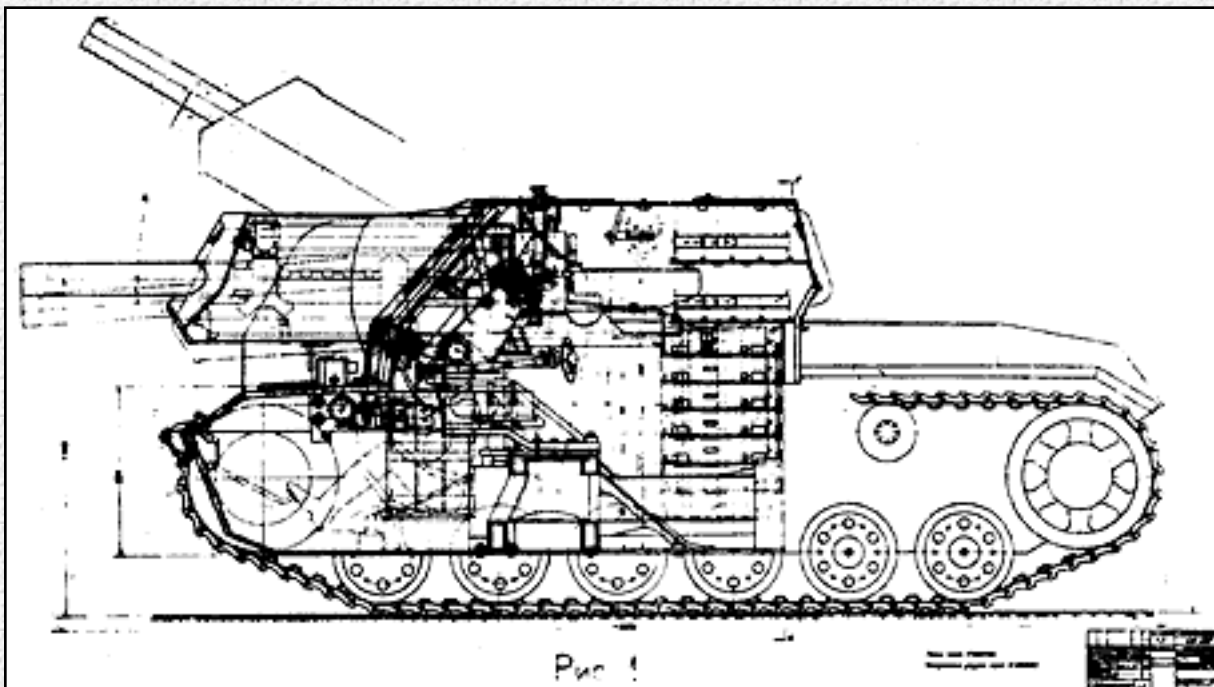
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The SG-122(A) Self-Propelled Gun

◀ [MAIN MENU](#) [SOLDIERS AT](#)
[WAR](#) [DOCUMENTS](#) [BATTLES](#) [TANKS](#) [ARTILLERY](#) ▶▶

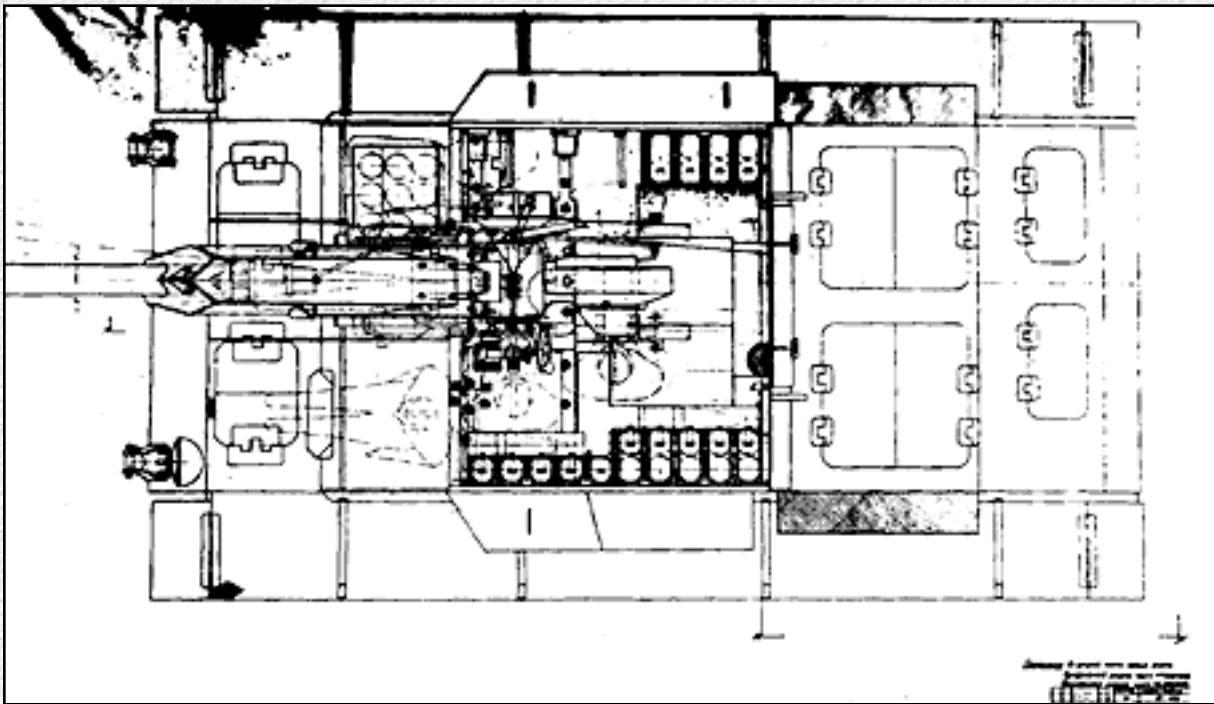


Due to the dramatic beginning of the Great Patriotic War, the Red Army lost almost all of its armored fighting vehicles and a large part of its artillery. At the time, the loss or evacuation of most of the Soviet factories meant that Soviet industry was unable to compensate for heavy Red Army losses. At that crucial moment every weapon that was available was used. There were many captured weapons from the First World War and the Russian-Japanese War stored in Red Army warehouses and arsenals, and they were now sent to the front. There were cases of ex-Japanese 105-mm guns, Arisaka rifles, and ex-German howitzers being used.



The slit of the SG-122(A). The production blueprint.

The Germans captured many Soviet vehicles. However, in spite of the Red Army being on the defensive, some German vehicles had also been captured. According to the report of the NKV (Narkomat Vooruzheniya - the Ministry of Weapons and Armament), about 20-40% of all captured vehicles couldn't be repaired because of a lack of spare parts, and especially a lack of armament parts. To solve the problem, on December 21, 1941, the Narkomat Vooruzhenia ordered all Soviet factories to make proposals for re-arming captured tanks with domestic armament. Some of the factories had time to build prototypes. These vehicles were shown to the NKV commission in February and March of 1942. Among those vehicles there was one from Factory #592. Work on the self-propelled gun was started before evacuation in the design bureau of Factory #592, although the factory's engineers weren't experienced in developing combat vehicles. In September 1941, the factory was redirected to repair tanks and artillery equipment, including captured vehicles (as time progressed, the number of them had grown extensively).



The view from the top (the roof is removed). The production blueprint.

I have been unable to find the exact date of starting work on the 122 mm self-propelled gun, but surviving blueprints are dated April 1942. The follow letter confirms this date:

"Top Secret.

To the Chief of the Repairing Center of the ABTU KA
brigade-engineer Sosenkov.

Copy: to the Director of the Factory #592
Pankratov.

According to the decision of the Deputy of the
Minister of Defense of the USSR Lieutenant-General
comrade Fedoreno, captured "artsturms"* must be re-
armed with the domestic 122 mm Howitzer M-30 Model
1938 in Factory #592. I ask you to give an order to
repair and deliver four captured "artsturms" to
Factory #592. To accelerate the process, the first
repaired "artsturm" must be delivered to the
factory before April 25.

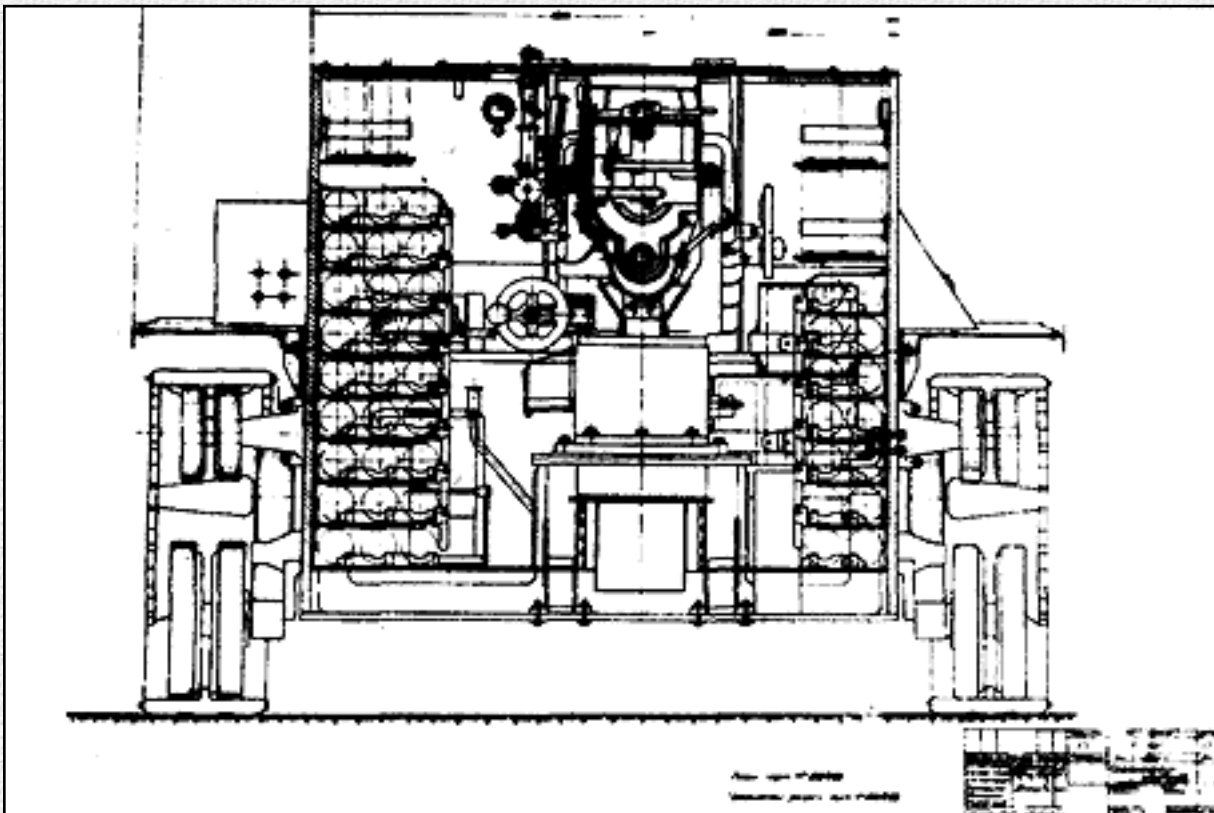
April 13, 1942.

The Chairman of the Tech Council, E. Satel"

* the "artsturm" was the Soviet name of the German StuG III assault gun.

The project designed by the group of engineers lead by A. Kashtanov was very simple. The new vehicle was based on the captured German StuG III with a new, more spacious, fighting compartment that allowed the mounting of the 122 mm Howitzer M-30 (the same as on the Soviet [SU-122](#)).

Why exactly the 122 mm howitzer? This was no accidental choice: at that time there was great shortage of 76-mm guns, while heavy 122 mm howitzers accumulated in the rear due to lack of limbers and artillery tractors. Therefore, the new 122 mm self-propelled gun was evaluated very high. In May 1942, the vehicle was sent to trials. By that time, it was named "The self-propelled assault gun SG-122 (Artsturm)" or simply the SG-122(A) (the SG means Samokhodnaya Gaubitza - Self-Propelled Howitzer).



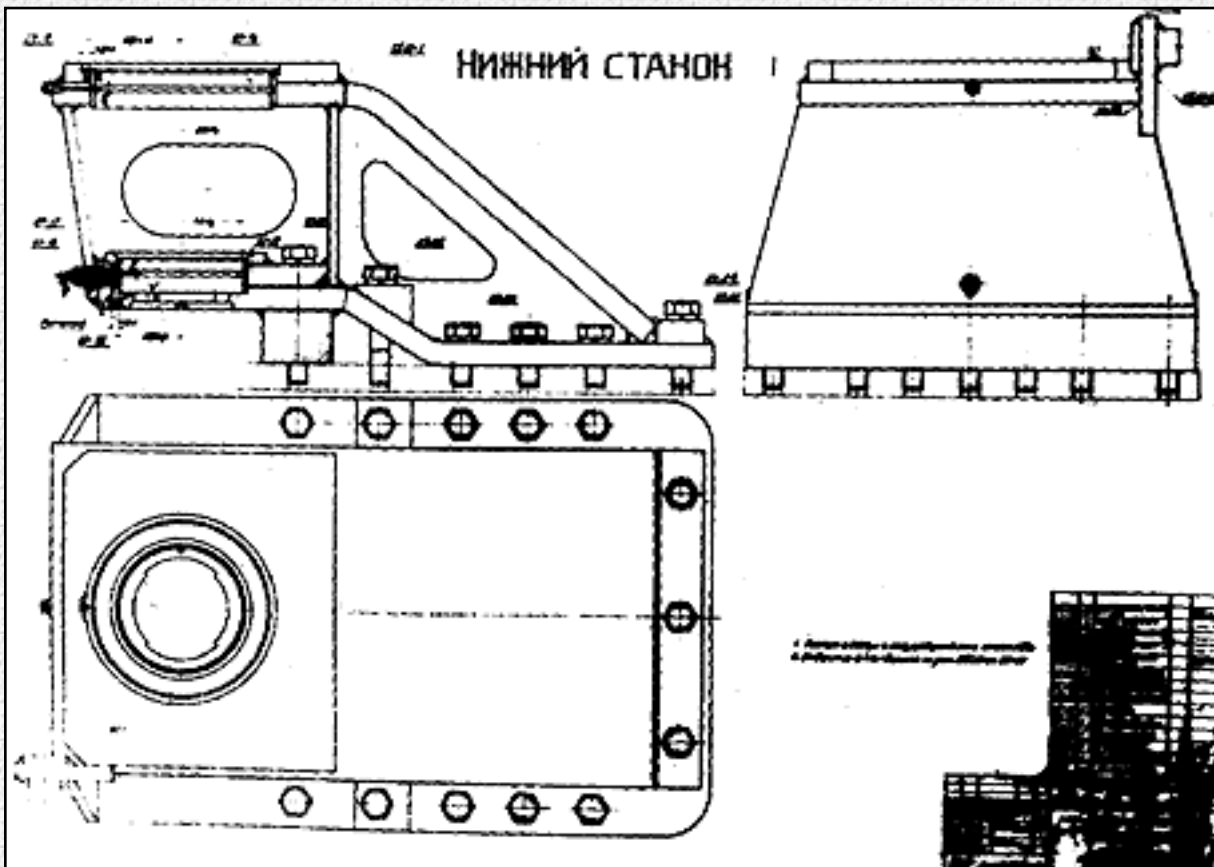
The cross cut of the improved SG-122(A). The production blueprint.

According to the existing description of the first prototype of the SG-122(A), it was based on either the StuG III Ausf C or the StuG III Ausf D. The original fighting compartment was removed and then a simple squared box was fitted. It was assembled (welded) of

45mm armored plate on the front and of 25-35 mm plates on the rear and sides. The horizontal welding seam was strengthened with 6-8 mm steel straps to provide it with additional strength.

Inside the fighting compartment was the M-30 howitzer instead of the original StuK 37. Most of the ammunition was distributed along the sides of the compartment, but some of the shells were stored on the bottom behind the howitzer's mounting.

The crew of the SG-122(A) was five men: the driver (located forward-left the vehicle); the commander (behind the driver); the first loader (behind the commander, who also operated the radio); the gunner (to the right of the commander); and the second loader (behind the gunner).



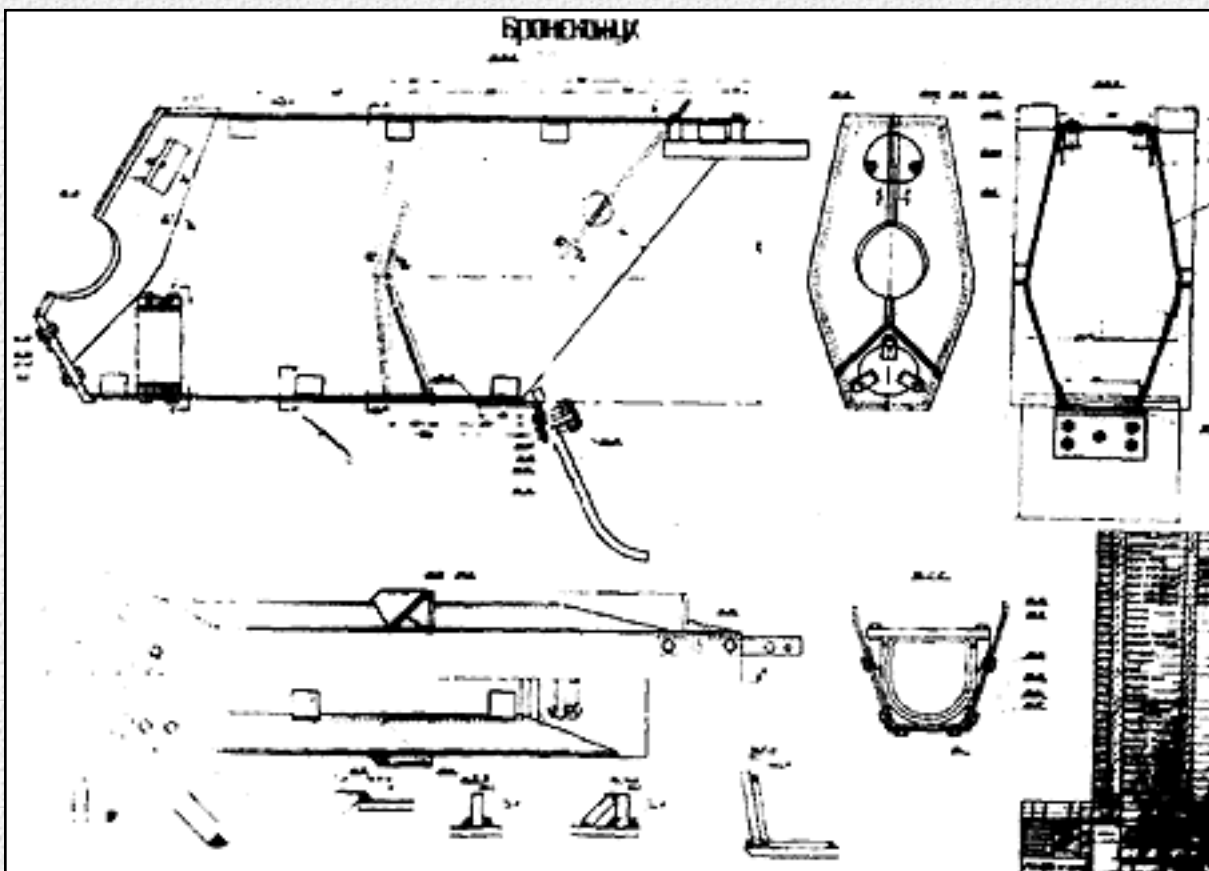
The pedestal of the 122 mm howitzer. The production blueprint.

The vehicle had two hatches: the first one located in the rear of the fighting compartment; the second one located in the front of the compartment (in front of the gunner). The SG-122(A) retained the original German radio. Unfortunately, I have no data about the internal communication devices.

The vehicle was tested by being run on gravel roads and run cross-country a total distance of 480 km. The vehicle fired 66 shots, both direct and indirect. All the trials confirmed good combat capabilities, but some disadvantages had been noticed, most important were:

1. Insufficient rough-terrain performance and overloading of the front roadwheels;
2. Too many duties for the commander, who must spot, aim the gun, command the crew etc;
3. Insufficient fuel capacity;
4. Impossibility to fire personal weapons from the pistol ports because of their poor layout;
5. Insufficient strength of the fighting compartment;
6. Insufficient ventilation of the fighting compartment.

The factory was ordered to improve all these shortcomings by developing an improved vehicle. It was also recommended to develop a new fighting compartment to fit on captured Pz-III tanks, which were much more numerous than captured StuG's, and it was recommended to make side hatch(es) for better evacuation from the vehicle.



The mantlet of the 122 mm Howitzer M-30. The production blueprint.

After analyzing all the shortcomings and fixing them, Factory #592 manufactured two improved SG-122(A). The type of chassis used distinguished them: the first one used the StuG's chassis while the second one was based on the chassis of the PzKpfw III. Both these vehicles were distinguished from the first prototype by the following improvements:

1. The fighting compartment was made of thinner armor (35 mm front; 25 mm sides and

rear). This decreased the whole weight of the vehicle and therefore increased its rough-terrain performance;

2. The crew duties were altered. Now, the gunner was placed in front of the commander and received his own hatch in the roof of the compartment (the hatch in the front of the compartment was removed). The commander received an artillery reconnaissance sight (like a submarine periscope), and he had a panoramic sight mounted in the hatch;

3. The German side pistol ports were replaced with Soviet-type (OGK NKTP) ports, which were developed for the "76-mm support assault gun." New ports allowed the firing of the Nagant and TT pistols and the PPSH submachine-gun;

4. The whole weight of the gun mount was decreased. To simplify the load, the gun was equipped with a folding tray. The new electrical ventilator was mounted over the breech-block of the gun;

5. To increase the fuel capacity, the SG-122(A) received external squared fuel tanks (from the BT and T-34 tanks), which were fitted on the sides. The original German entrenching tools were replaced with Soviet tools;

6. The radio was relocated from the left side to the right in the fighting compartment. To increase the protection, it was recommended to angle the side armor of the fighting compartment 10-20°.

Especially for the SG-122(A), the "Uralmash" Factory developed a cast gun mantlet. This mantlet was much better and cheaper than the original one - it did a better job of protecting the gun from bullets and shell fragments, and it allowed the removal of the large shields which were installed on both sides of the gun (these shields were quite heavy and thus overloaded the front roadwheels).

In September 1942, Factory #592 was ordered to produce ten improved SG-122(A). Most probably, the order wasn't accomplished due to a lack of armor plates and captured German vehicles. It is interesting to note that employees of the factory insisted that they were delivering SG-122's from May 1942. They also mentioned that they couldn't start frost-bound German engines, and Soviet drivers poured burning petrol in the carburetor to start the engine. Nevertheless I think it wasn't 1942, but 1943, when the [The SU-76i](#) appeared.

Today I have no exact data about the total number of SG-122's manufactured. Until the end of 1942, eight self-propelled guns (both 122-mm and 76-mm) were made using the StuG's chassis, also two vehicles were built using the Pz-III and Pz-IV chassis. By November 15, 1942, there were three experimental SG-122(A) on the Sverdlovsk proving ground, two of them using the StuG's chassis. On December 5, 1942, one of the SG-122(A) based on the Pz-III was delivered to the Gorokhovetsij proving ground for the comparative trials with the U-35 (further SU-122).

After comparative trials, the production plan for 1943 was cancelled. On February 11, 1943, all existing SG-122s (including experimental vehicles) were placed at the disposal of the Chief of the GBTU to form training self-propelled regiments.

REFERENCES:

[Specification of Soviet tanks](#)

[Specifications of Soviet tank guns](#)

Proof-reader:

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Special thanks to:

[Serge Starostin](#)

Sources:

I.Moshanskij, M.Kolomietz "Trohpei v Krsnoj Armii" Frontovaya Illustratzia #1, 2000;

"Poligon" #1, 2000

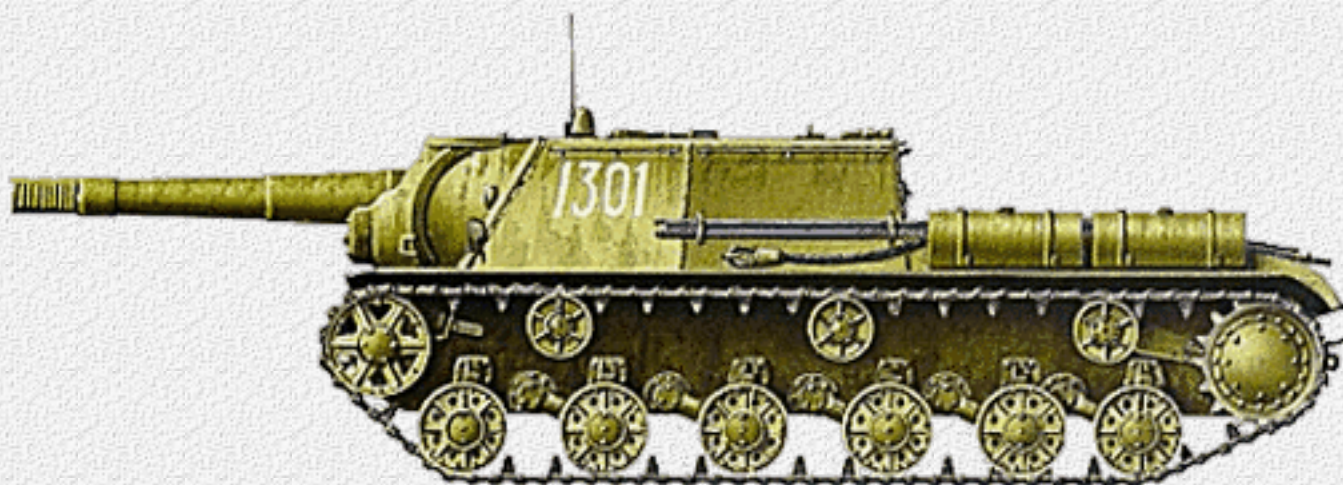
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The SU-152 Heavy Assault Gun

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The SU-152 of major Sankovsky destroyed 10 German tanks in a first battle. Kursk. The 13th Army, August 1943.

After introducing the newest German tanks, the work over a new self-propelled gun KV-14, armed with 152 mm ML-20 gun, started in the USSR.

The ML-20 cannon had 655 m/s muzzle velocity and was capable to penetrate 110 mm vertical armor from distance of 2000 metres. The weight of the AP shell for this cannon was 48.78 kg, and 43.6 kg for the fragmentation shell. Although the SPG was developing for close infantry support, it could

been used as a tank destroyer. In early February 1943 the works on project of KV-14 was finished.

Due to big back-blow of ML-20 it has been mounted in compartment instead of usual tank turret (like KV-2).



The SU-152 of lieutenant S.F.Berezin. 2nd Baltic Front. Summer 1944.

Cannon had a rate of fire only 2 shots per minute because of multi-part loading shot. Cannon was equipped with panoramic sight (for indirect fire) and telescopic sight ST-10 (for direct fire). Range of direct fire - 700 metres. All KV-14 assault guns were equipped with 10-RK-26 radio and internal phone TPU-3. KV-14 was based on [KV-1s](#) tank chassis that was still in production.



Major F.N.Nagovitzyn the commander of the battery of SU-152 assault guns giving an order to tank commander lieutenant S.F.Berezin. 2nd Baltic Front, 1944.

On February 14, 1943, the GKO accepted for service a new assault gun under new signature SU-152. In 1 March 1943 the mass production of SU-152 has begun in Chelyabinsk. Up to end of 1943 there were built 704 of new assault guns. During the production a new turret device for 12.7 mm DShK AAMG has been designed.

The first regiment of new assault guns was formed in May 1943. Soviet tankeers accept the new SPG with delight due to its ability

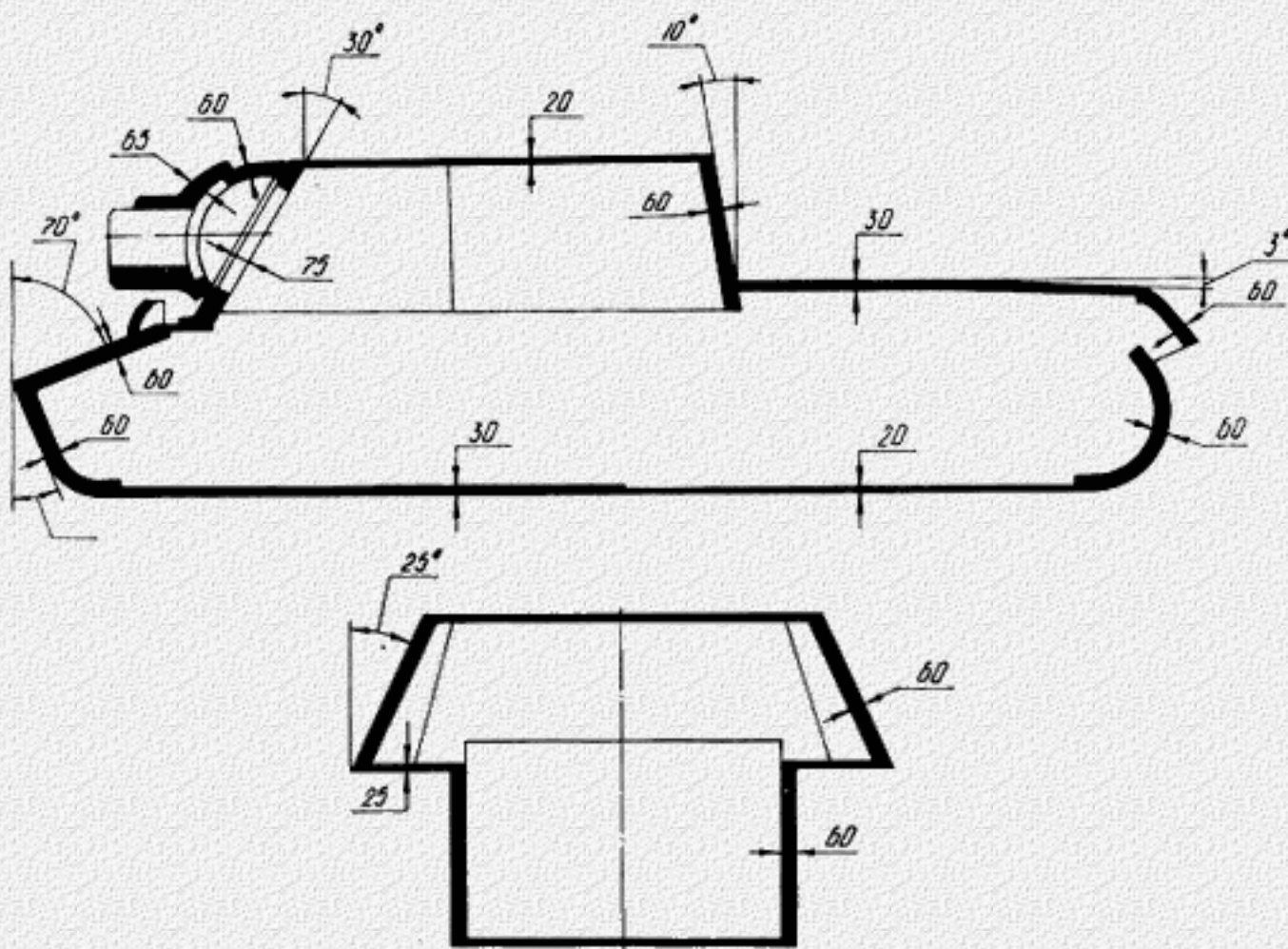


A SU-152 of 368th Guard Heavy Artillery Regiment supporting the assault of 4th Guard Tank Corps of 60th Army of 1st Ukrainian Front. Notice a heap of cartridge-cases laying on the vehicle. Lvov. 27 July 1944.

to successful counteraction with German "zoo" (like "Tigers" and "Panthers"). During Kursk battle SU-152 received a new nick - "Zveroboy" ("Animal Killer") because during 12 days of battles this regiment could destroy 12 "Tigers" and 7 "Ferdinands". This regiment consisted of 12 SPGs, and later - of 21 SU-152 (winter 1943-1944).



Interior of the SU-152 of major Sankovsky. Kursk. July 1943.



REFERENCES:

[Specification of Soviet tanks](#)

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Assault Guns of the "ISU" Series

◀ [MAIN MENU](#) [SOLDIERS AT](#)
[WAR](#) [DOCUMENTS](#) [BATTLES](#) [TANKS](#) [ARTILLERY](#) ▶



The ISU-122 heavy assault gun

The success of the [SU-152](#) forced Soviet tank designers to develop another vehicles based on new IS tank, which production begun in Cheluvabinsk. Works on "Object 241" performed at the same time as the works on [IS-1](#) (IS-85) heavy tank. New assault gun looked like its predecessor - SU-152, though the new one had a higher compartment. Internal capacity of both vehicles was equal, so they had an equal amount of ammunition - 20 shots. Both vehicles had the same armament - 152 mm ML-20S gun-howitzer. In summer 1943 the new "object 241" was showed to the GKO and after that it was accepted to the Red Army service under "ISU-152" designation.



The SU-152 heavy assault gun (for comparison)



The ISU-152 heavy assault gun



The ISU-122 heavy assault gun



The production ISU-122S heavy assault gun.

The main problem during mass production of the new assault gun was lack of ML-20S cannons. Soviet artillery plants weren't able to produce them in proper quantity. Although there were plenty of 122 mm A-19 cannons and huge number of 122 mm ammunition. As a result, in summer 1943 the SKB-2 (design bureau in Chelyabinsk) has been ordered to check the chance to mount A-19 cannon instead ML-20S.

It was easy because both cannons had the same gun-carriage. At the end 1943, the very first prototype - "Object 242" - has been finished. Then it was tested and accepted for service under the ISU-122 designation. By the end of 1943, the first party of the new ISU-152 and ISU-122 were ready, simultaneously with the first IS-1 heavy tanks.

During the war there were several attempts to increase the firepower of the ISU-122. The A-19 cannon was modernised for usage with IS-2 tanks. For this purpose cannon has been equipped with a new semi-automatic block-breech and renamed as D-25S. After modernisation, the practice rate of fire (don't mix with maximum ROF!) increased from 1.5 to 3 shots per minute.

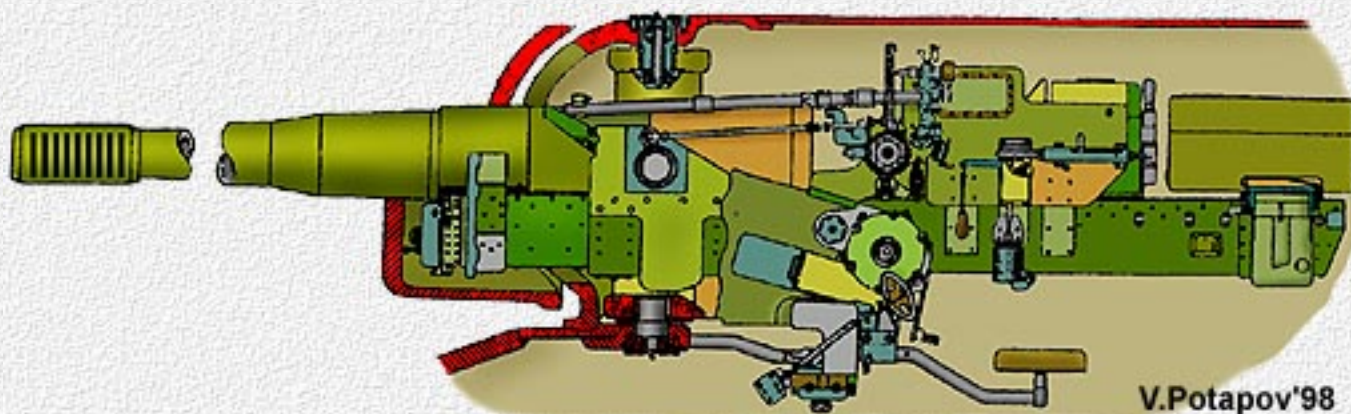


The prototype of the ISU-152 assault gun.

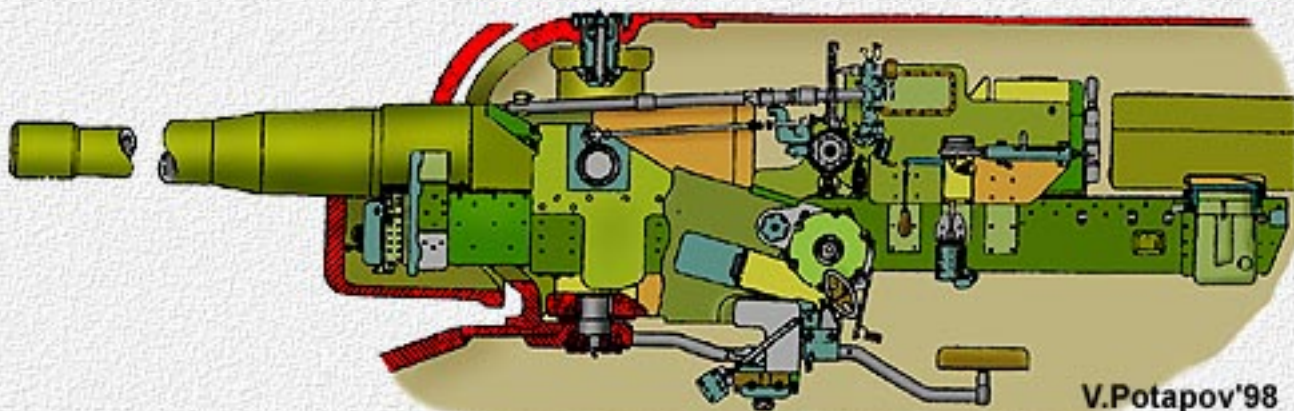
Soon, the idea to mount D-25S on the ISU-122 was suggested. The new prototype with the D-25S was named "Object 249". This vehicle had a new gun mantlet, also crew's layout was improved. "Object 249" was accepted for service and renamed as ISU-122S (or ISU-122-2) designation.

The ISU-152, ISU-122 and ISU-122S heavy assault guns were based on IS-2's chassis. Most of their mechanisms and devices

were unified with the IS-2's ones. Although those assault guns were equipped with different fuel tanks.



The ML-20S gun mount (ISU-152).

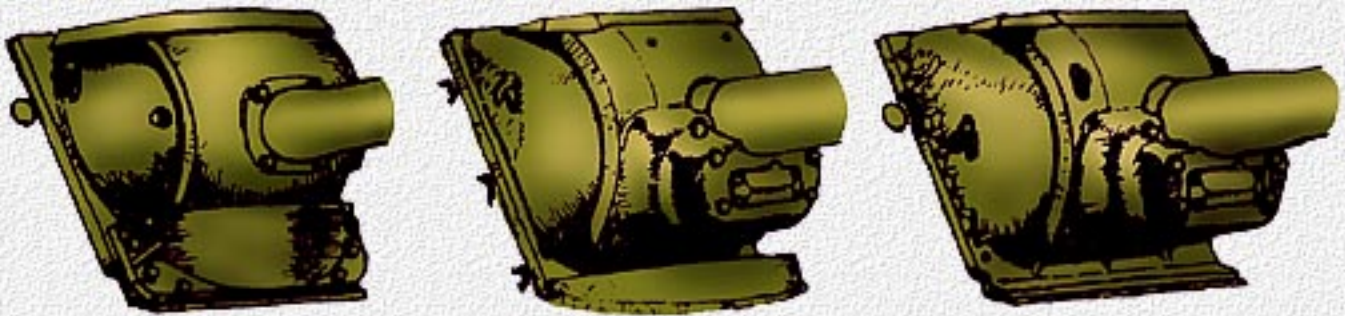


The D-25S gun mount (ISU-122 and ISU-122S).

The ammunition of the ISU-152, ISU-122 and ISU-122S consisted of several types of separate loading shots:

- Semi-AP rounds;
- Fragmentation or high explosive rounds (depends of fuse).

The crew was armed with either PPS or PPSH sub-machine guns and several grenades F-1 (in the US Army they known as "pineapples").



Gun mantlets of various ISU: the ISU-122S (the left one), the SU-152 and the ISU-122/152



The ISU-130 experimental assault gun.
(V.Potapov)

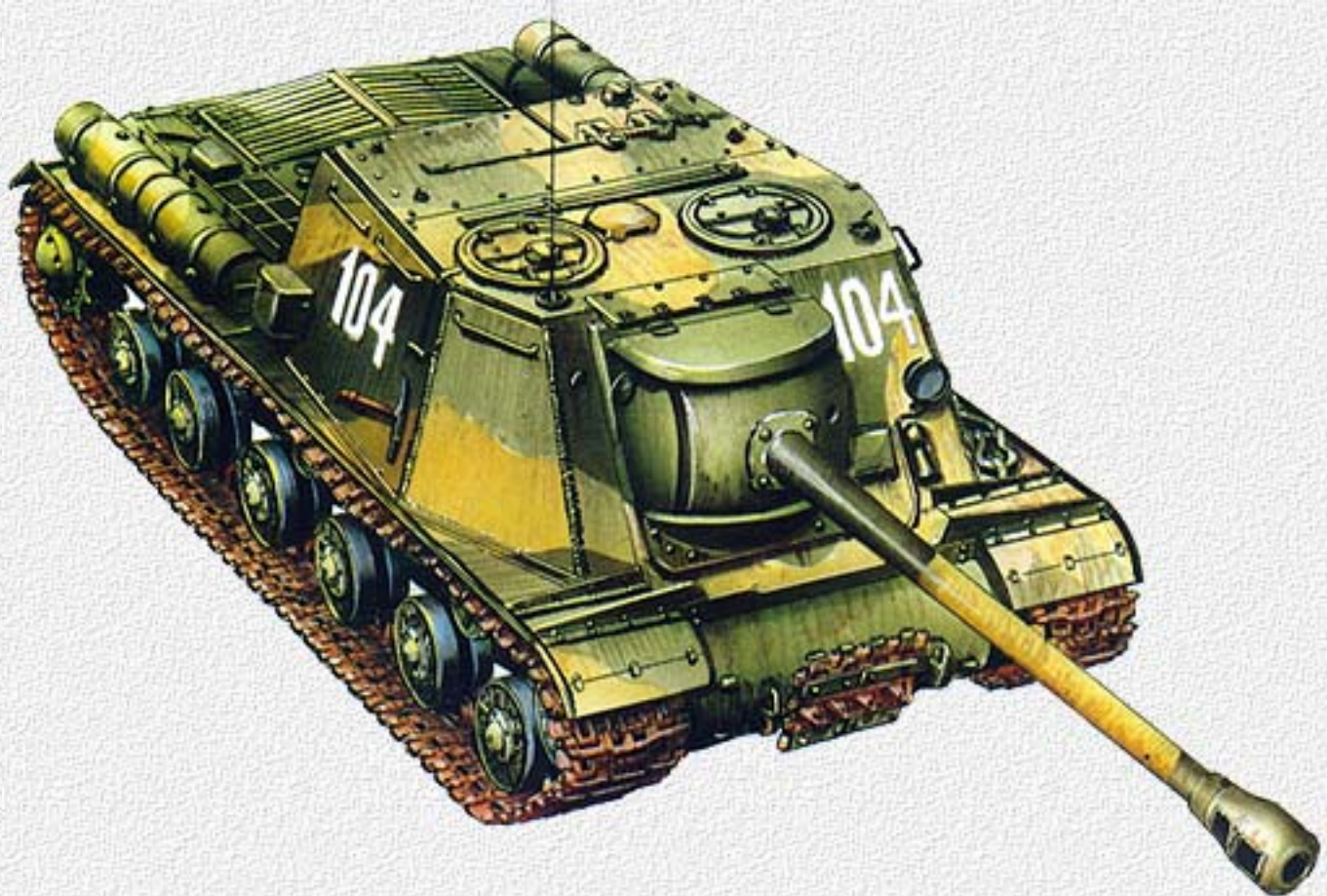
During war there were some ideas to rearm these assault guns with various artillery systems: the 152 mm long barreled gun BR-8, the 152 mm gun BL-10, and the 130 mm S-26. Prototypes of all these vehicles have been built, but due to different reasons non of them were accepted for service. Two of them are now displayed at Kubinka. There are ISU-152 with the BL-10 and the ISU-130 with the S-26.



The ISU-130 experimental assault gun. (V.Potapov)



The experimental ISU-152 with the BL-10 gun. *(V.Potapov)*



The ISU-122S heavy assault gun

"ISU" assault guns in action.



The ISU-122 of the Polish 25th Self-Propelled Artillery Regiment crossing the Neisse river. April 1945.



The ISU-122 (in front) and the IS-2 (behind) running through a small Rumanian town. September 1944.

From the spring 1944, the Heavy Self-Propelled Artillery Regiments (the Russian abbreviation is TSAP) of SU-152 being re-equipped with new ISU-152 and ISU-122 assault guns. All those regiments received the "Guards" designation. By the end of the war, totally 56 of such units were formed.

Each regiment had 21 ISU-152 or ISU-122 or a kind of mixture of both types. Both assault guns used for the same tasks. Russians didn't distinguished them and used them for same tactic tasks. The Russians strove do not mix them in same units though.

In March 1945 the 66th Guard Heavy SP-Artillery Brigade has been formed. It was organized on three regiments: totally 1804 men, 65 ISU-122 and 3 [SU-76M](#).

In February 1944, the very first units with ISU's were formed. They were named as the tank units, for example: Independent Heavy Self-Propelled Artillery

Regiment (OTSAP - "Otdelnyy Tyazhelyy Samokhodno-Artilleriskiy Polk"). OTSAP consisted of four batteries (5 vehicles per battery plus one vehicle for regiment's commander). The tactic employment was the same as for common Heavy Tank Regiments: support the offensive operations. All OTSAPs were in Army's and Front's subordinate (mostly in reserves). Those assault guns used mainly for the long range gunfire because they weren't effective at short ranges. The slow ROF did them

ineffective in close combat.

The ISU-122 became the most effective long-range tank destroyer, while the ISU-152 had the average armor penetration. That was because of absence of AP ammunition and slower muzzle velocity. That's why many western sources consider the ISU-122 as a "tank destroyer" and ISU-152 as an "assault gun". In fact, both guns were heavy assault guns, cause they used in this manner (as I said above, Russians used them for the same purposes). ML-20S was able to penetrate the 120 mm vertical armor from the 1000 metres, A-19 - 150 mm armor from the same distance. In spite of absence of machine-gun(s), all three types of these assault guns were very effective weapon for a street fighting because of powerful guns with a great HE effect.



**The ISU-152 on the street of Polotzk
(Byelorussia). July 1944.**

The first large-scale usage of the new assault guns was in summer 1944, during the Soviet offensive operation "Bagration", where at least 14 OTSAPs were involved. Soon, these guns acquired the honor of very effective weapon against German "Tigers" and "Panthers". For example, in summer 1944, the half of the 502th PzAbt (6 vehicles of 12 total) was destroyed by ISU's gunfire.

Often those Heavy Self-Propelled Artillery Regiments used together with tanks or infantry and supported their attacks. Usually those ISU's become the main defensive weapon during sudden German counter-attacks.

For example, on January 15, 1945, in East Prussia near the Borove town, Germans launched a counter-attack against Soviet



The ISU-152 assault gun of the 1419th OTSAP of the 7th Guards Tank Corps. Poland. 17 January 1945.

infantry that was supported by 390th Guards OTSAP. Soviet infantry retreated behind the regiment's positions. The regiment opened a direct fire, many of the German AFVs were destroyed and most of German soldiers were killed. The counter-attack failed.



The ISU-122S assault gun. Königsberg. April 1945.

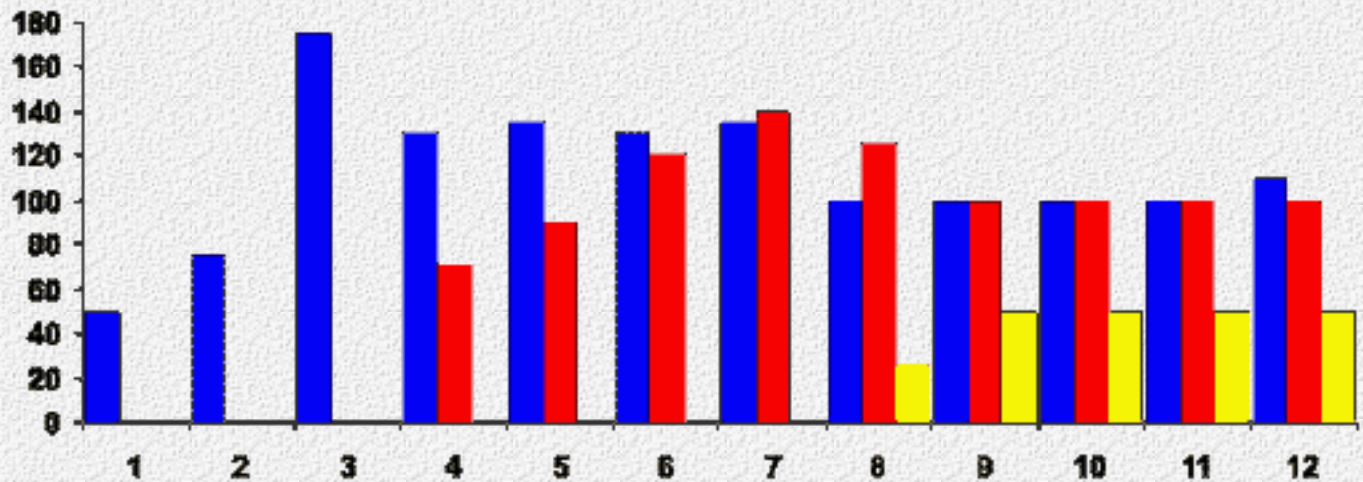
Time to time, ISU's used for artillery missions because they were able for both direct and indirect fire. In particular, during the Sandomir-Silesia offensive operation, the 368th Guards OTSAP of the 1st Ukrainian Front was assigned for artillery mission and for 107 minutes the regiment fired 980 shells.

As a result, two German mortar batteries were destroyed as well as other 8 German guns, about

one German infantry battalion was wiped out. Interesting to note, that additional rounds were placed at the vehicles, but anyway, ISU's used their "internal" ammunition first. Otherwise, rate of fire become slower because it takes up to 40 minutes to load 20 rounds into the vehicle.



The interior of the ISU-152 assault gun.



Manufacture of "ISU" assault guns in 1944:

Blue: the ISU-152; Red: the ISU-122; Yellow: the ISU-122S

[A post-war usage of ISU](#)
[Specification of Soviet self-propelled artillery](#)
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The Post-War Usage of Assault Guns of ISU Series

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The ISU-152 heavy assault gun. The Suez Canal, 1973.



The "Condensator-2P" heavy self-propelled gun

After the end of the World War Two, additional works were accomplished to develop a new self-propelled gun on the base of IS-3. The new SPG was armed with the 152 mm gun-howitzer ML-20SM. This SPG distinguished from its predecessors (the ISU-122 and the ISU-152) by increased armor protection and improved angles of the frontal armor.

However, due to several serious

drawbacks this SPG did not put in a mass production, while a mass production of the ISU-152 has continued up to 1955, and 2450 vehicles were built in a post-war period (plus a 4075 were produced in a time of war). The manufacturing of ISU-122 was cancelled just after the end of war, but in 1947 its production was re-started and has continues up to 1952 and about 3130 were produced. After the end of war these both assault gun were modernised twice: in 1956 and 1959.

At the end of 1950th a two new self-propelled guns have been developed: a SPG of a special purpose "Condensator" (armed with 406 mm SM-54 gun) and "Oka" (armed with 420 mm mortar of Shavyrin's design). Both vehicles were based on ISU (IS) chassis. That was a Russian answer on a new American 280 mm "nuclear gun".



The self-propelled gun-mortar Oka.



The self-propelled gun-mortar Oka.

At the beginning of 1960th, after the introducing of a R-11 "Skad" and a "Luna" (FROG-3) missiles, the chassis of ISU was choosed for a new 8K11 (SS-1b "Skad") missile launchers. Later, they have been modernised for launching a R-17 "Zemlya" missiles, and those launchers were renamed 8K11/8K14 (SS-1c "Skad B"). These modernised missile launchers served in Soviet Army since 1961, but sooner they were replaced with 9P117 (wheeled variant).

From 1959 some existed ISU were modernised to heavy prime movers BTT-1. In 1960 they were modernised and renamed BTT-1T. Though the IS tank were not exported in large amount, their variants used widely outside the USSR.

Most of all those vehicles (which were based on IS chassis) served in Poland: 10 ISU-152s and 22 ISU-122s. The Poles formed the 25th Self-Propelled Artillery Regiment that completely consisted of ISU-122 assault guns.

As element of the 13th Polish Tank Corps this regiment took part in battles at Nysa river in March of 1945. The Poles wanted to form one more regiment (a 13th Self-Propelled Artillery Regiment) but they didn't because of lack of proper number of ISU-152.

As a result, the 13th Regiment had a mix structure: two batteries of ISU-152 (5 tanks per battery) and two batteries of SU-85 (5 tanks per battery as well). That unit took part in Berlin Operation. ISU remained in Polish service after the end of war, some of them were modified as repair-evacuation vehicles (at the end 1960th).

Egypt was a single country that bought a large amount of ISU-152. By the beginning of 1960th it had at least one regiment equipped with ISU-152. During a wars in 1967 and in 1973, Egypt used these assault guns. Later, ISU-152 have been used as a pillboxes along the Suez Canal.



2K1 rocket launchers on military parade at the Red Square.

the MAZ-543 heavy wheeled truck.

The 8K11 and 8K11/8K14 rocket launchers were used widely by Poland, Czechoslovakia, Eastern Germany, Rumania, Hungary and Bulgaria. These countries received that weapons in 1960-1961 as a part of a weapon modernisation program (for Warsaw Block only).

Later, Poland and Eastern Germany replaced their tracked 8K11 and 8K11/8K14 with more reliable wheeled variant 9P117. By the way, the 9P117 was based on

REFERENCES:

[The ISU-122 and the ISU-152 assault guns](#)

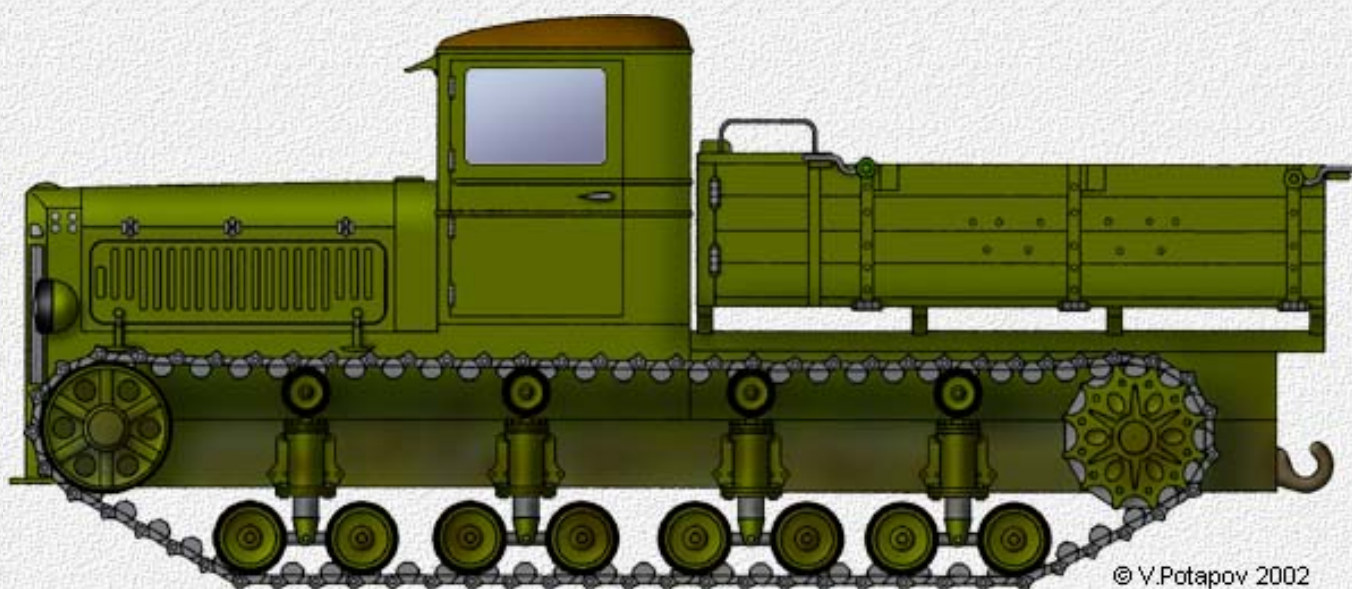
[Specification of Soviet tanks](#)

[Specifications of Soviet tank guns](#)

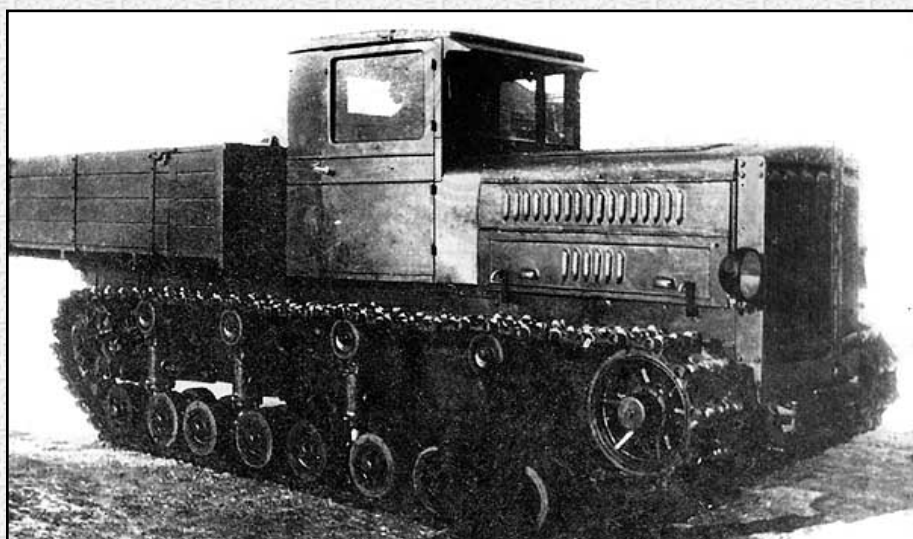
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The "Komintern" Heavy Artillery Tractor

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In 1930, the General Tech Bureau of GUPV VSHKh together with head design bureau OAT undertake several projects of tractors for Red Army needs: "small tractor for RKKA", "medium tractor for RKKA" and "big tractor for RKKA". It supposed that all tractors would be based on production tanks, which served already in Red Army.



The "Komintern" artillery tractor. Probably 1934.

To solve such problems like transporting heavy artillery (guns and howitzers up to 11 tones), crew and ammunition, development of a new heavy tractor has begin. By 1934, tractor was built and passed all trials successfully. It was accepted for service as "artillery tractor Komintern" (means "Communitic International"). It was based on "maneuverable tank T-24" (according to old Soviet classification).

It powered by diesel engine of 131 h.p. Despite of dismal fate of its predecessor (T-24), that tractor was luckier and was put into mass production.

Of course, "Komintern" inherited several disadvantages of T-24, but some of them were fixed by designers, some other, being important for tank, weren't so significant for tractor. It used widely for transporting all types of field artillery and howitzers, including 18-ton 203 mm howitzers B-4. From 1940, mass production of "Komintern" was cancelled and switched to more modern "Voroshilovets". From 1934 to 1940 about 1800 tractors were manufactured.

Parameter	"Komintern"
Year	1933
Crew, men	2
Weight, kg	10 500
Length, m	5.765
Width, m	2.3
Height, m	2.538
Ground pressure, kg/cm ²	0.495
Clearance, m	0.4
Engine	4-cylinder diesel, 131 h.p.
Fuel, litres	550
Max. speed, km/h	30
Range, km	220

Sources:

A.Beskurnikov, M.Svirin "First Soviet Tanks", Armada #1

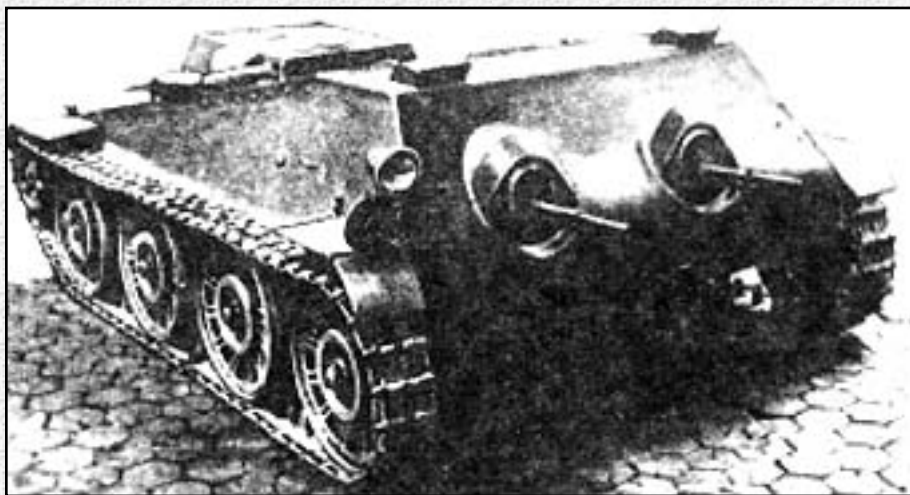
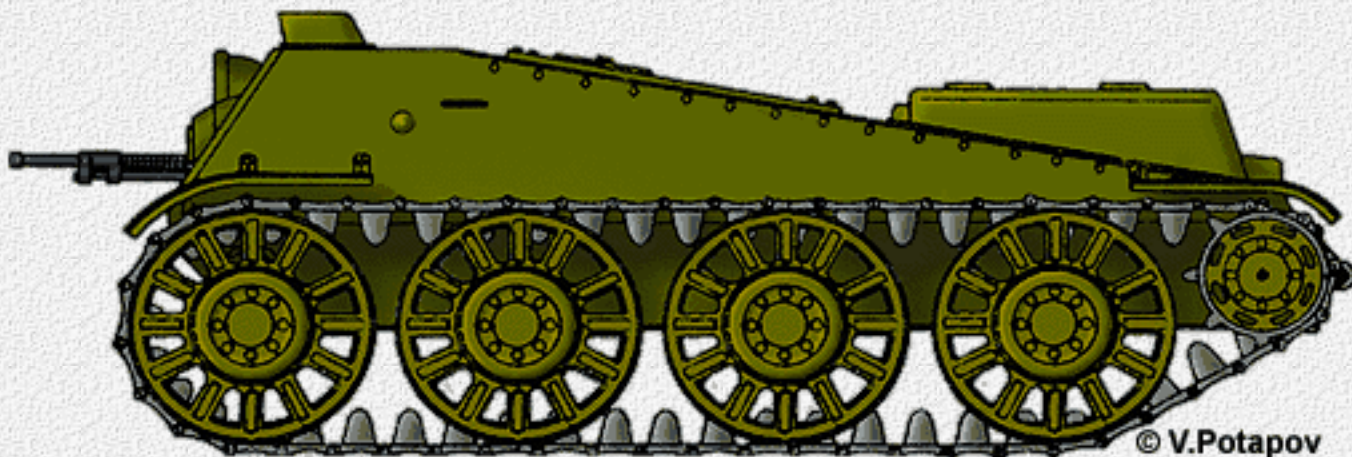
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The PPG Tankette

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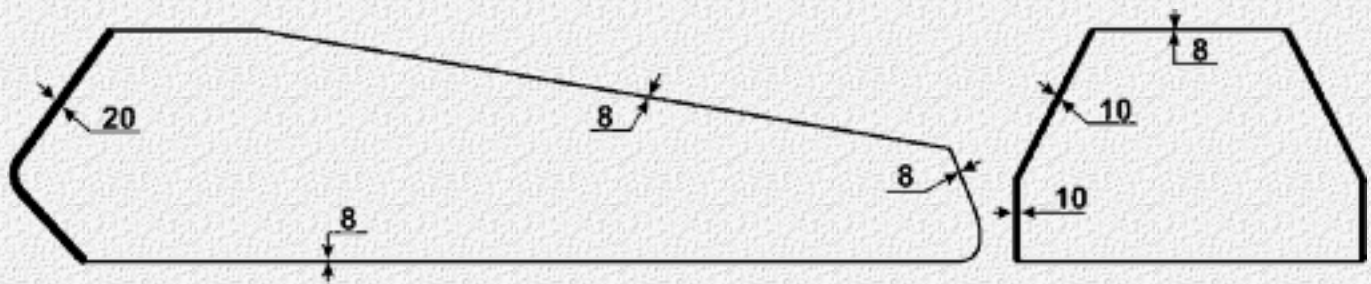


The tankette in the LKZ Factory. 1940.

In March 1940, LKZ's Design Bureau developed a new tracked tankette "Object 217". Works were led by J.Y.Kotin, Chief-Engineer was L.E.Sychev. New vehicle was intended to be a close support armored fighting vehicle and considered as mobile armored machine-gun. During works, vehicle received "PPG" designation.

The most glare feature of the PPG was it crew layout. During movement they were in sitting posture and armored hatch is opened; in combat position the hatch is closed and crewmen are in a prone position. On long distances, the PPG intended to be transported by a truck.

The PPG Tankette was intended to be used in battles on Karelian isthmus during the Winter War. In spring 1940, one tankette was manufactured but the Winter War ended, so all further works on PPG were delayed and later abandoned at all.



REFERENCES:

[Specification of Soviet tanks](#)

[Specifications of Soviet tank guns](#)

Sources:

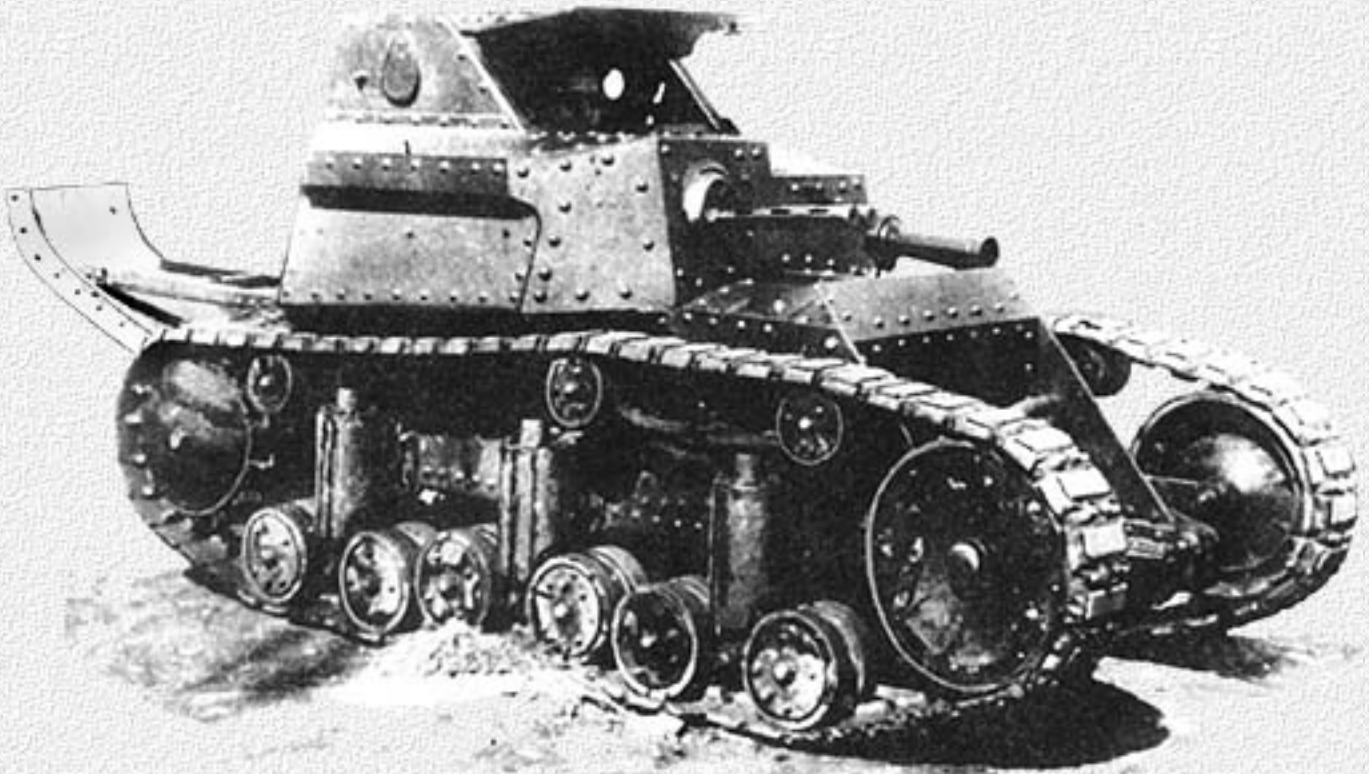
M.Pavlov, I.Pavlov "Soviet tanks and SP guns", Arsenal-Press, 1996.

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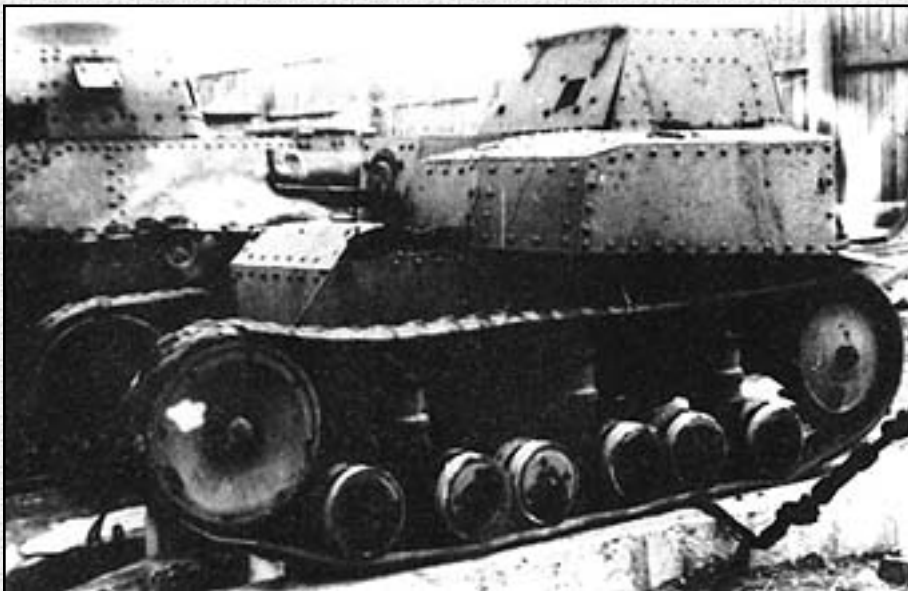
T-17 Tankette

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T-17 Tankette. The very first vehicle with metal tracks. (*J.Magnuski*)

Note: All Russian terms and abbreviations marked as *red italic* are described in the [Glossary](#).



According to three-year program of tank building, before December of 1930, the "plan minimum" called for a production, of a battalion of "support pulemetka", that's how tankettes were called in that document. So in 1926, *KB OAT* starts working on a project of light, one seat reconnaissance tank "Lilliputian". The project was well balanced, but it needed a development of a special chassis and engine.



T-17 Tankette. Second prototype with rubber-metal tracks. (M.Kolomiets)

The project was attempted to accomplish many times, but it did not progress any further than its discussion on various levels. On March 3, 1928, chief of Engine Laboratory A.P. Kushka along with L. J. Lalmen, as well as engineers S.A. Ginzburgh and E. Grote offered a project of the new tankette. As a base for it, they used elements of a running gear and a transmission of the prototype T-16 Close-Support Tank. Armor hull from tank

"Lilliputian" was used. It was powered by the two-cylinder air-cooling engine, being as though "half" of engine T-16. The tracks were made of rubber and metal.

The hull of the tankette, which have received index Ò-17 (frequently called, as the predecessor, "Lilliputian"), was riveted on a frame. Driver was seated in the compartment, at same time acting as a machine-gunner; the machine-gun was offset to the right side (there also was a cannon version of the tankette).

Production of the prototype of T-17 was delayed, and it was ready only in autumn of 1929. Despite of technical faults, its driving characteristics were tested first in January of 1930, and later in June of the same year. It proved better mobility, than that of [T-18 tank](#), however one of its biggest shortcomings was the fact that it was one-manned.

Because of that, one of the three tankettes, ordered by summer 1930, had to have two-man crew. Second prototype of T-17 had rubber tracks of "Kergess" type. Mass production of T-17 was thought to be inexpedient, and a decision was made to continue work on a two-man tankette with use of standard units from T-18.

REFERENCES:

[T-18 Development History](#)

[Combat Employment of the T-18](#)

[Specification of Soviet tanks](#)

[Specifications of Soviet tank guns](#)

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[Pavel Poljakov](#)

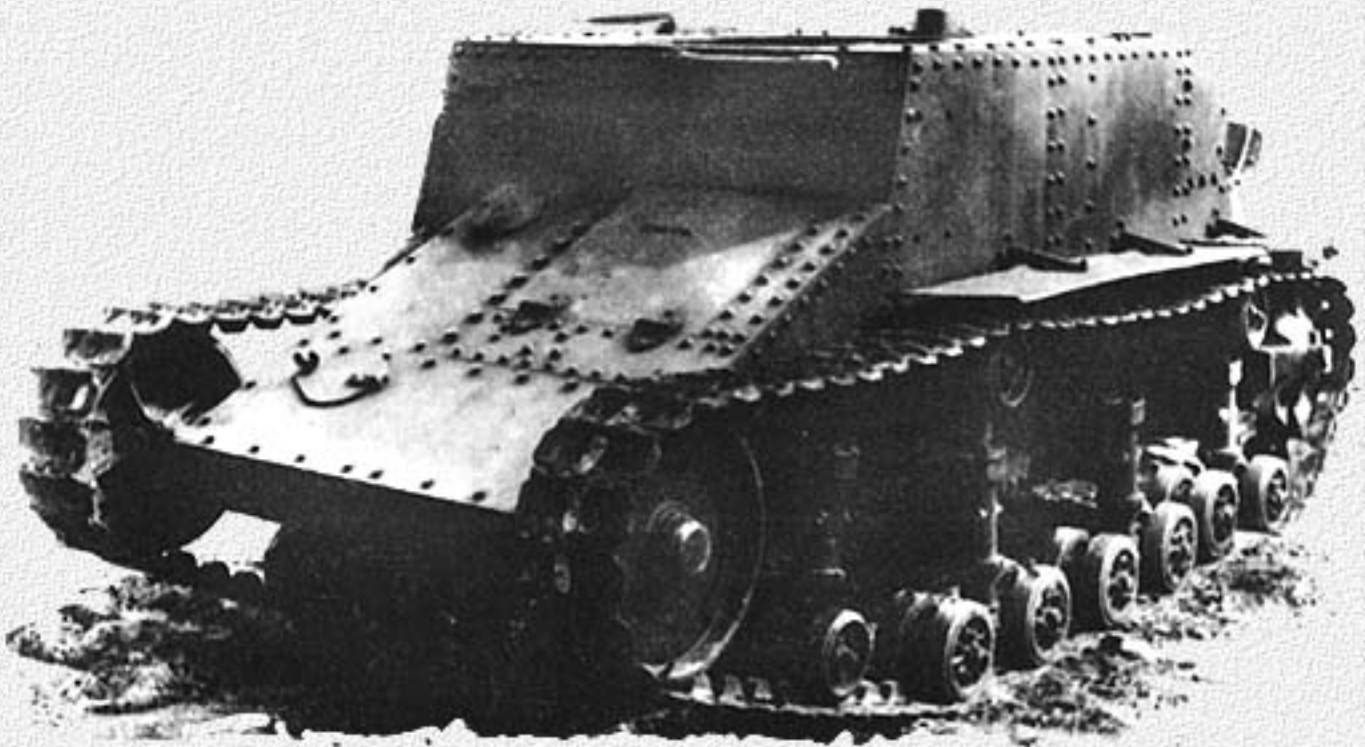
Sources:
A.Beskurnikov, M.Svirin, "Pervye Sovetskie Tanki" Armada #1.

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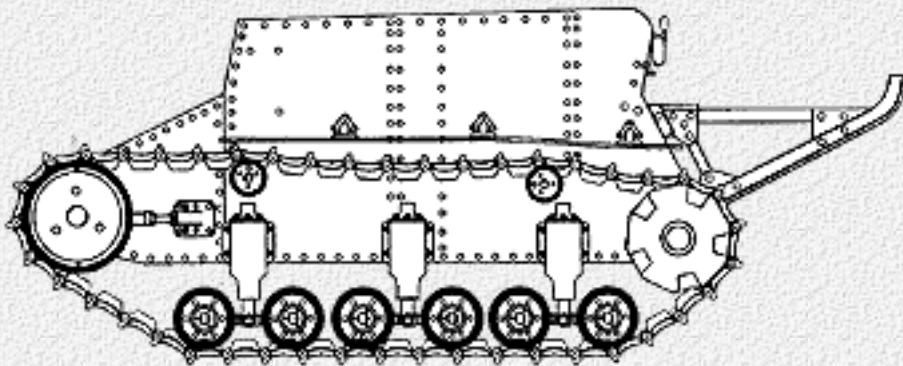
T-21 and T-23 Tankettes

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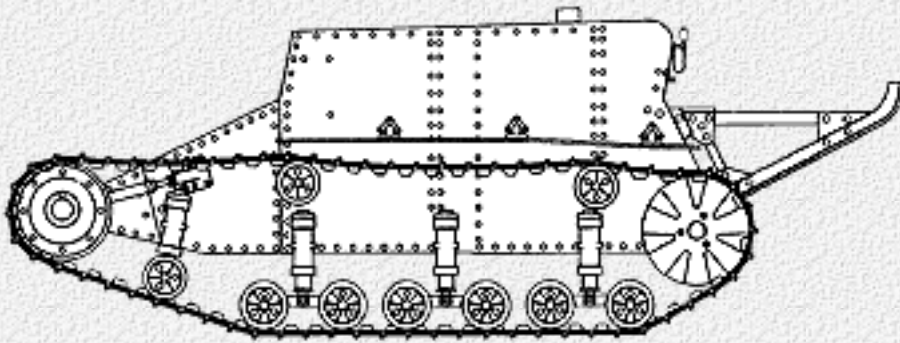
T-23 Tankette. (*M.Kolomiets*)

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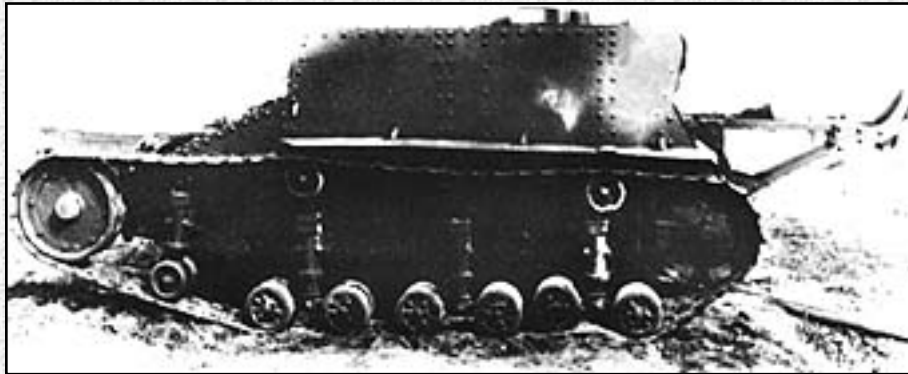


Initial project of the T-23.

In 1929-1930's a project of tankette T-21 is started, becoming a logical continuation of [T-17 Tankette](#). T-21 was classified as a "Small Reconnaissance Tankette", and closely resembled T-17, except that it had two-man crew, increased armor (13 mm) and support wheels from [T-18 Escort Tank](#). The engine of power 20 h.p, and transmission were borrowed from T-17. However at this stage of development, its estimated speed of its movement and the



T-23 Tankette that was actually built.



T-23 Tankette. (M.Kolomiets)

characteristic of overcoming obstacles appeared insufficient; so the project wasn't authorized.

In 1930, on an assignment of **RKKA** headquarters, and considering experience with T-17, works begin on a new two-men crew tankettes T-22 and T-23, classified as "large reconnaissance tankettes". Their difference was in the engine: T-22 was planned with original four-cylinder engine, and T-23 with the engine from tank T-20. Also, the difference was in location of crewmembers: on T-22 they were placed one after another, and on T-23 - in a row. Each project had its own strengths and weaknesses,

but T-23 was chosen for production, as more economic and simple to build. First prototype of T-23 had a hull of simple metal and engine from T-18 (40 h.p.), but for second prototype a special modified engine of not yet finished T-20 was used, and four more were ordered. All tankettes were produced on 2nd Automobile Factory VATO (director - S.F. Ivanov), and works on T-23 were carried out in surprisingly short time and good quality.

During the production, tankette underwent countless technical modifications, which had almost completely changed it. Its length was increased by almost 300 mm. Instead of basic and supporting wheels from Ò-18, those of Ò-19 tank were used. A new facilitated track, with a new driving wheel was implemented, as old ones did not provide a speed of 40 km/h. However, even with the involved improvements, the tankette was unsatisfactory, since its price was almost that of the tank T-18, and in a version with a turret, even surpassed it (over 59 thousand rubles without armaments!), which did not allow for its mass production in required numbers. If the three-year program on support tanks had even surpassed its plan, for tankettes it was not even completed, which made it necessary to purchase a license for production of British tankette "VCL" (Vickers Carden-Loyd) to satisfy **GUPV** executives.

REFERENCES:

[T-18 Development History](#)

[Combat Employment of the T-18](#)

[Specification of Soviet tanks](#)

[Specifications of Soviet tank guns](#)

Translated by:

[Pavel Poljakov](#)

Sources:

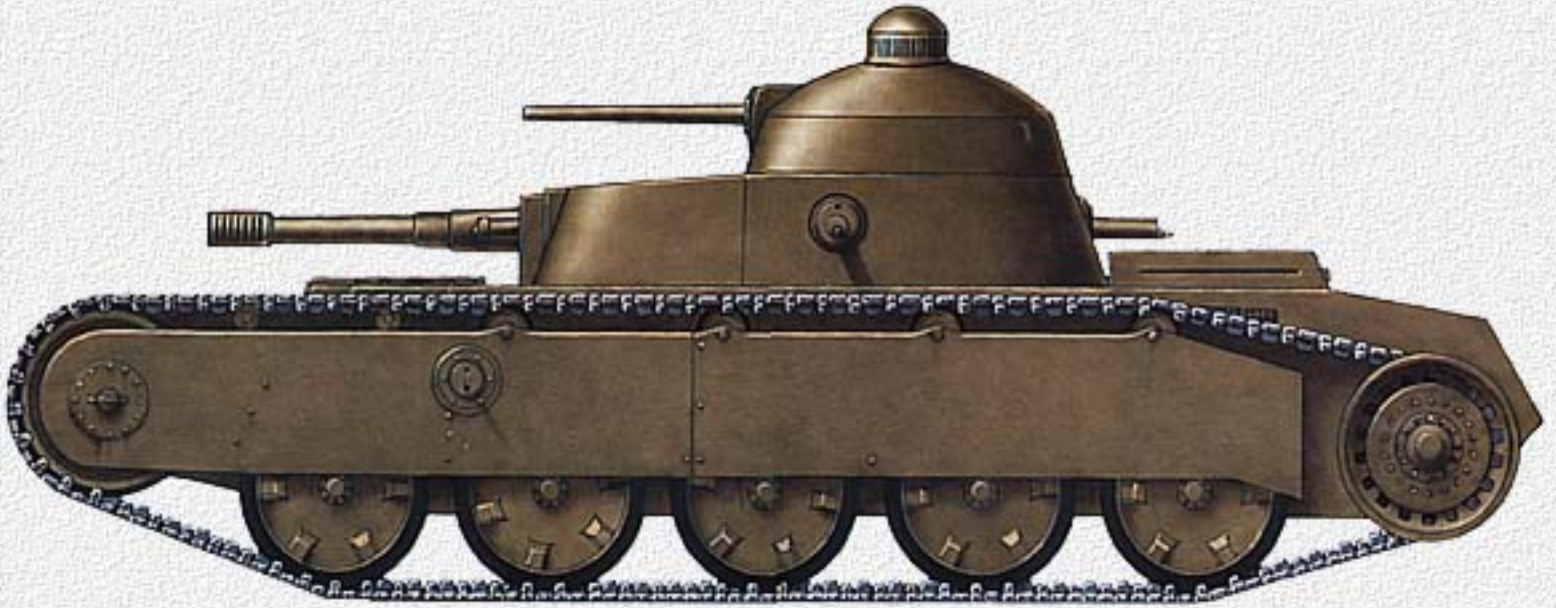
A.Beskurnikov, M.Svirin, "Pervye Sovetskie Tanki" Armada #1.

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The Powerful Medium Tank TG

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Note: All Russian terms and abbreviations marked as *red italic* are described in the [Glossary](#).

Led by German Engineer, Edward Grote, work began on a heavily armored, medium-weight tank as an alternative to the [maneuverable T-24](#), in 1930. Members of the Soviet Mission, after visiting Germany in late 1929/early 1930, invited Grote to the U.S.S.R. After his arrival, Grote began his work at the Design Office AVO-5, within the Aviation Engine Department of the "Bolshevik" Factory. Here, in 1930, steps were being taken to manufacture the experimental, TG Tank (Tank Grote).

The TG was expected to have a combat-ready weight of 20 tons, a top speed of 40 km/h, a cruising speed of 25 km/h, and 15 mm, 20 mm, 30 mm in armor. The 240 hp (176.5 kw), air-cooled, carburetor engine for the TG Tank, was specifically designed by Grote. The armament comprised of one 76 mm-cannon, one 37 mm-



The Powerful Medium Tank TG

cannon and 4 or 5 machineguns. **OGPU** and **NKVM** were instructed to proceed with the testing and completion of the TG Tank. The assignment was given priority, as one of the most important tasks within the category of experimental tanks for 1931. The first series of 50-75 tanks were planned to familiarize the overall production process. Prior to completion,

preparatory work and trials for the experimental TG Tank were also planned. Therefore, manufacture of the T-24 was continued as a temporary measure. After the completion of 80 T-24's, the production line was closed and the mass production of TG's was planned in the **KhPZ**. 2,000 TG Tanks were projected for manufacture in 1932.

S.A. Ginzgurg, head of Design Bureau #3 of the **VOAO**, visited Great Britain at the end of 1930. In the course of discussions with British Engineers, he learned of the new, 16-ton Tank, A-6 (Mk-III). Also in the discussions at the Vickers' Factory, he learned of the tank's layout and the technical and tactical parameters. Ginzburg presented a detailed report on the new tank upon arrival to the U.S.S.R., which caught the attention of the Red Army High Command. Moreover, the Mark III was the closest to complying with the requirements of, accepted "System of Tank-Tractor-Motorcar-Weapon-Armament of the **RKKA**," and was superior to the TG Tank.



The Powerful Medium Tank TG. VAMM. 1931.

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Meantime, the "Bolshevik" Factory was working on the prototype of the TG Tank. Resolution No. 2 of the Defense Committee, from 9/2/31, set up the project management. Medved', (**OGPU**), was General Administrative Manager, K.K. Sirken was Head of Design Bureau, N.V. Barykov was Deputy for Manufacturing, and A. Vorobiev, (**UMM**) was Deputy for Design. The experimental TG Tank was completed in the summer of 1931. The tank featured three-level armament positions, elongated hull to 7.5 meters, turret located in the rear, a high box section located under the turret, a running gear with high tracks that was covered by an armored skirt, and a small observation turret with a periscope and a hydraulically assisted transmission controls.

The tank was armed with a 76.2 mm-Grote-Syatchentov-Cannon, with a slit muzzle brake with a wedge type breach and three ball-mounted Maxim-Machineguns, all set in a box section under the turret for a second level of armament. The cannon could be turned $\pm 10^\circ$ in a horizontal plane and elevated from -8° to $+12^\circ$ in a vertical plane. Two DT-Machineguns, in ball-mountings were fixed in side plates of the driving compartment, which constituted the first level of armament. Both guns had a limited arc of fire.

The third level of armament comprised of a 37 mm, PS-1 Cannon in a rotating turret located on top of the box section. The cannon could fire at ground and low flying targets at an elevation of -12° to $+30^\circ$. Ammunition consisted of fifty 76.2 mm shells, eighty 37 mm shells and 7,000 rounds for the machineguns.

The five-man crew consisted of: a driver, commander, (also responsible for the 37 mm-cannon), machine gunner, and a gunner and loader, (76.2 mm-cannon). The driver had



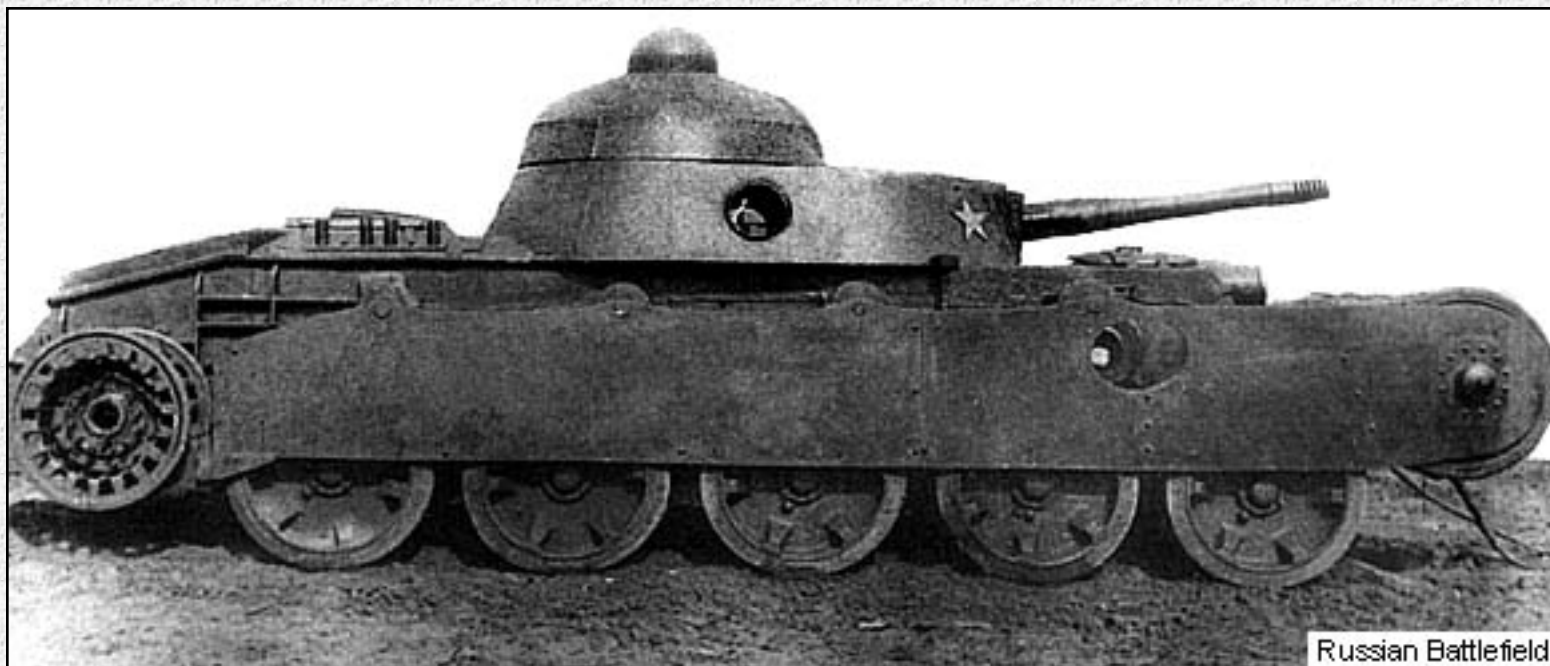
TG on wheels. VAMM. 1931.

three vision panels with slits for field observation while driving. A periscope was mounted on top of the turret for the tank commander. On top of the driving compartment, (2) oval hatches provided access to the tank.

The light armor consisted of 8, 13, 16, 20 and 30 mm, rolled, steel-plates, jointed together by welding. In the rear section of the hull, a M-6 carburetor-engine, throttled to produce 250 hp, (184 kw)

powered the TG. (The engine designed by Grote was not ready at the time of the trials). Transmission gears included a multi-disk, main dry-friction clutch, a six-speed gearbox with V shape teeth, and a full reverse mechanism, (2) side clutches, and (2), one-step reduction gears housed in the front wheels.

The suspension had individual springs (i.e., [Christie Tank](#)). The running gear was made of (2) idlers, (10) large-diameter, road wheels with 'Elastic' lining, (6) support wheels, (four of medium diameter with external shock absorbers and two of smaller diameter), and driving sprockets located at the rear which are locked with tracks by a chain. All of the road wheels were equipped with brakes in the event that tracks broke or fell off.



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TG on trials at NIIBT proving ground.

Road tests took place from June 27 to October 1, 1931. The 25-ton tank had a top speed of 35 km/h on paved roads and a range of 165 km in open terrain. The transmission and traction systems, along with the steering gears proved unreliable during tests.

Representatives of *UMM* and *VOAO* formed a committee to study the test results. Upon conclusion, it was agreed to designate the tank as an experimental type. Further testing of all new features was required. Despite rectifying the faults that were found during testing, it was decided that the TG Tank would not be introduced to production. Further work on the TG Tank was suspended and the services of Edward Grote were no longer required. Soon after, in August 1933, Grote was requested to leave the U.S.S.R. Despite the fact that the TG did not enter mass production, Soviet Engineers gained substantial experience in the design of medium weight tanks.

REFERENCES:

[Specification of Soviet tanks](#)

[Specifications of Soviet tank guns](#)

Translated by:

[Krzysztof Pawlowski](#)

Proof-reader:

[Scott Y. Barbo](#)

Sources:

M.Pavlov, I.Pavlov, I.Zheltoy "Sovetskie Srednie Tanki Dovoennogo Perioda" Armada #7, 2000:

M.Kolomiets, I.Moshanskiy "Mnogobashennie Tanki RKKA" Frontovaya Illustratsiya #5, 2000;

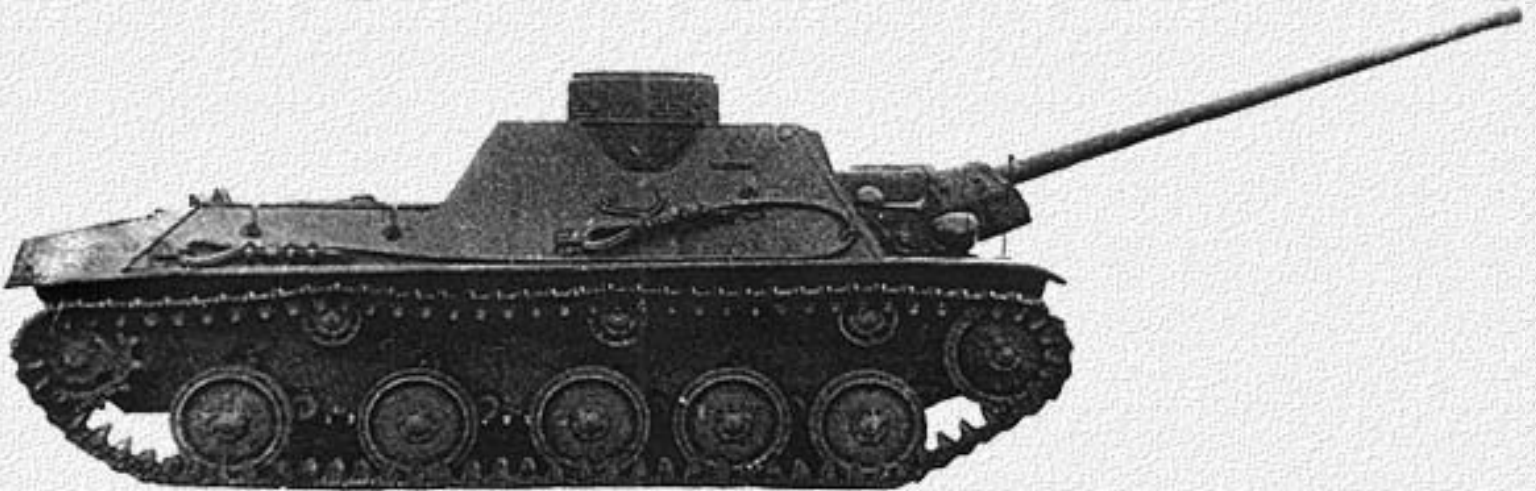
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Russian 'Hetzer'

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Tank killer NATI with S-1-57 57mm gun. (*M.Svirin*)

Note: All Russian terms and abbreviations shown as *red italic* are described in the [Glossary](#).

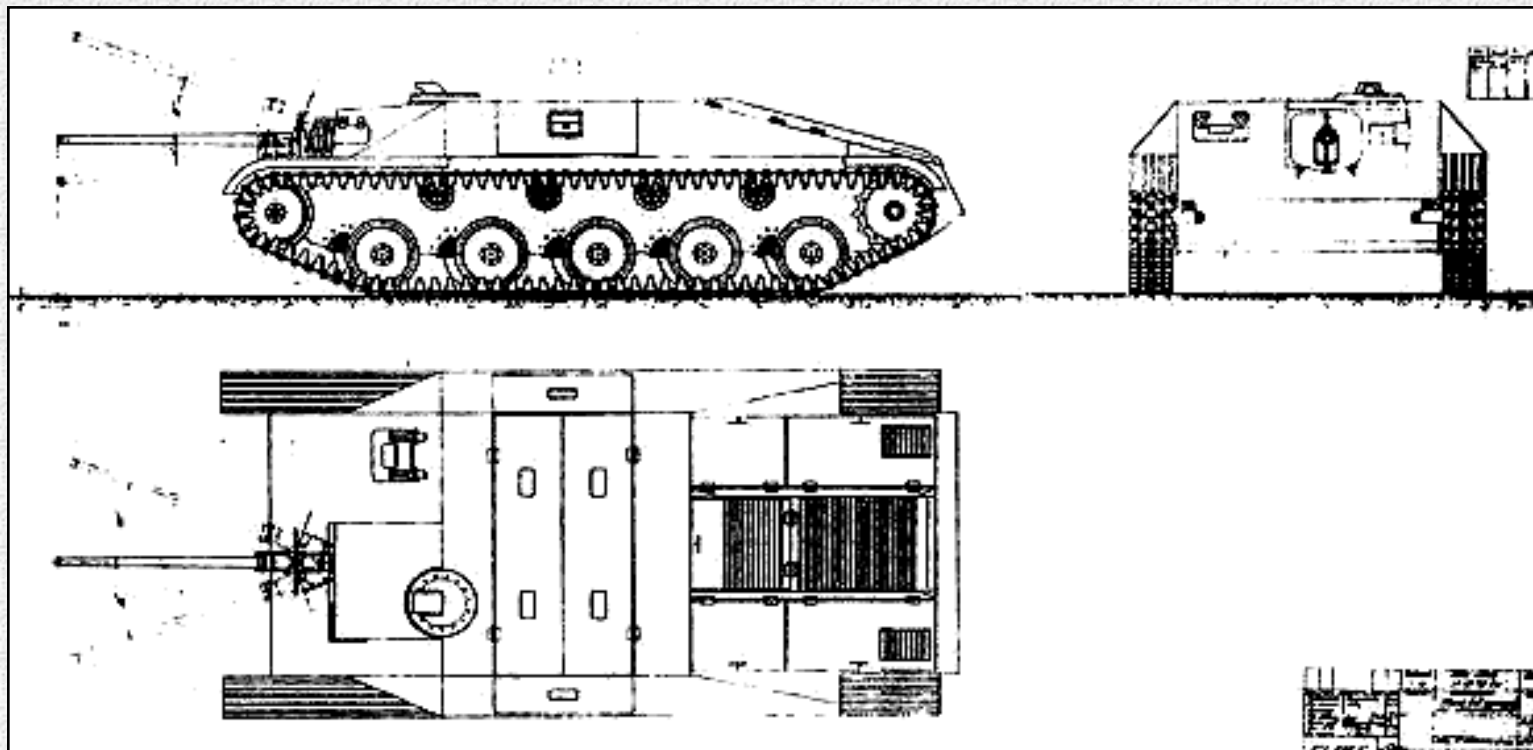
There is hardly a fan of armoured vehicle who, upon hearing the name "Hetzer", would not conjure up an image of that vehicle. This low "coffin", armed with a powerful 75 mm gun, became one of the most successful combat vehicles of the Third Reich. Many current tank fans who give due respect to this self-propelled gun, react disparagingly to domestic light SP-Guns and their creators, ostensibly for having not given thought to such a project. On the contrary, these designers were actively working on similar SP-Guns in the USSR, and in fact began these efforts much earlier than in fascist Germany.

Strictly speaking, the history of the Soviet SP-Gun tank killer began in April 1941, even before the invasion by fascist Germany. At a session of the KO *SNK* of the USSR, plans were being discussed for the production of the [T-50 Main Battle Tank](#) for the current year. Marshall G. Kulik was present and expressed the concern about the 57 mm tank gun not being prepared for the T-50 tank. He raised the issue of *"the development on the T-50 chassis of a tank destroyer, armed with a 57 mm high velocity type-1941 ([ZiS-2](#)), as well an anti-aircraft tank with 25 mm, or 37 mm automatic gun for protection of tank units on the march and in deployment against attacks by enemy tanks and aircraft."*

On 19 May 1941, S. Ginzburg reported, in a letter to the Marshal, regarding the preliminary draft design of such a tank killer by the design group (project leader Naumov) of the Main Design Department of Voroshilov Plant #174. This report stated, in part:

"The realization of the T-50 tank killer with a revolving turret, with the specified tactical and technical parameters, is not deemed possible at the present time without significant reconfiguration of the hull and redesign of a large number of components. This will require significant expenditure of time and material resources. The rapid realization of the assigned task can be achieved satisfactorily if a revolving turret were to be abandoned and the tank killer were to be developed in a turretless form.

This will permit a high degree of protection for the crew behind armour plate positioned at shallow slope angles and will not hinder the employment of the vehicle. The 57 mm high velocity gun can be mounted in the front glacis of the tank or in a special armoured housing with the possibility of conducting fire in the horizontal plane to 45 degrees [22.5 degrees to the left and right of the centre line - **V.Potapov**]. The commander's cupola must be retained. Undoubtedly, the absence on this tank killer of a revolving turret is one of its deficiencies. However, this case can speed the development significantly and meet the strict timetables laid down by Comrade Narkom [Kulik]. This turretless tank will undoubtedly be significantly more powerful, cheaper, hardly spotted, and lighter than any other modern tank that exists in the inventory of the Red Army."

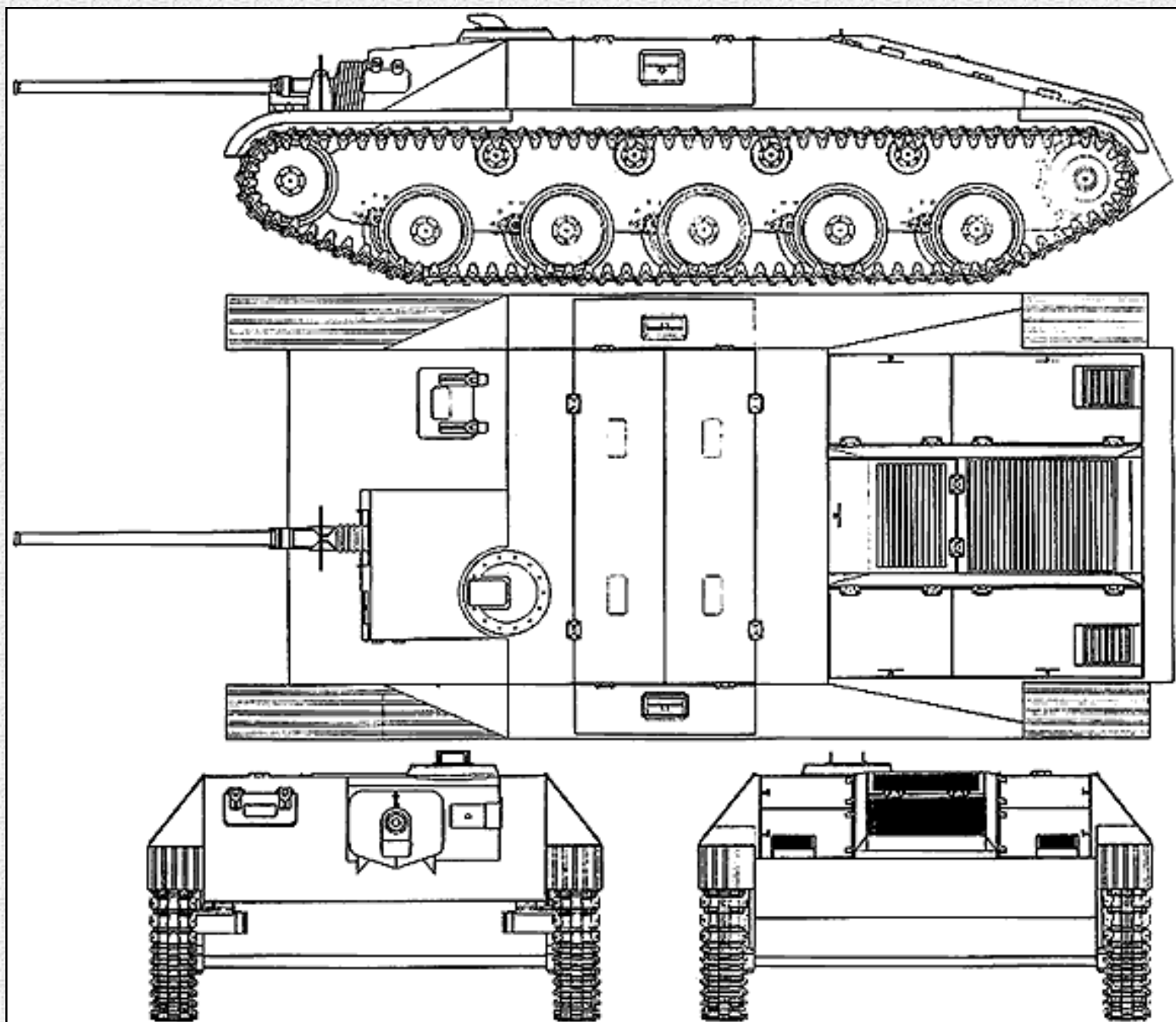


Design of I13.76-SU NII-13. Plant drawing, 1942. (*M.Svirin*)

Unfortunately, no images of the design of this Soviet "Hetzer" have been found, nor any documentation of the decisions made regarding it, by the higher authorities. With the start of the war, Plant #174 was consumed by the hurried production of the T-50 tank, and then was evacuated twice. As a result, no subsequent work was conducted on this tank killer.

A few words should be said regarding the power plant of the T-50 tank. A special in-line diesel engine V-3 was developed in 1940, which was "one-half" of the famous V-2. The V-3 was to be installed in light tanks and tracked prime movers from 1941-42. Among the deficiencies of the V-3 engine identified by designers, was the requirement for a vertical alignment would complicate its installation in the hulls of light tanks. With a working displacement of 11.9 litres and nominal output of 225 hp at 1750 rpm, this engine was very attractive to Soviet industry in view of its high degree of standardization with the 12-cylinder V-2. However, before the start of the war, Plant #75 did not undertake its serial production.

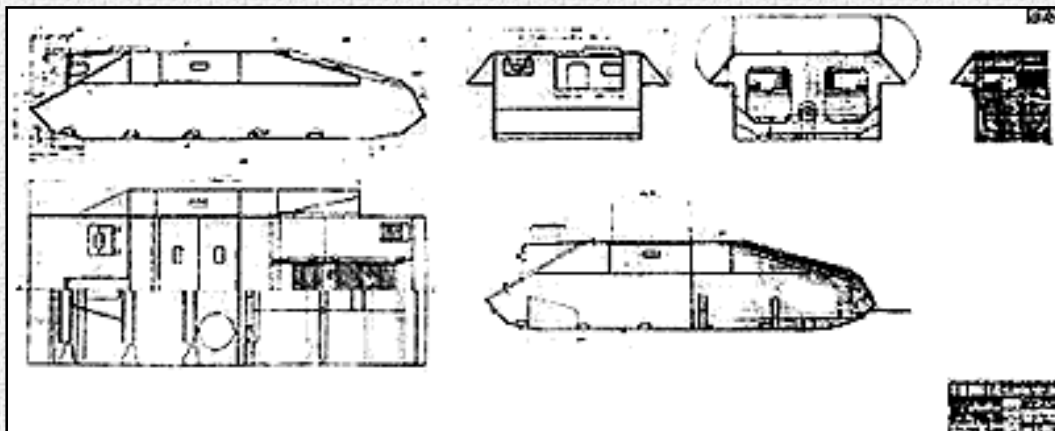
Also in 1940, Plant #185 completed development of diesel engine #744. The primary feature of this engine was that it totally replaced the standard engine of the T-26 tank. This was a 4-cylinder, 4-stroke, water-cooled diesel with a nominal output of 150 hp at 1700 rpm. The diesel was intended to initially equip the T-26-1 tank and derived combat vehicles during the planned sweeping modernization of the 1941-1943 period. However, its production was not undertaken in 1941; during the course of the war not one engine plant that attempted to organize its production was able to assure the supply of fuel pumps, and consequently could not produce the engine itself.



Design of I-13.73-SU NII-13. Reconstruction. (M.Svirin)

Practically all the initial designs of the SP-Gun that were undertaken during the war, were looked upon as universal artillery assets for the support of tank units or infantry, oriented primarily at combating enemy tanks. These were, in large part, the inexpensive "tanks without turrets" that could be produced in large numbers on existing equipment with available resources.

In the fall of 1941, Plant #174 began producing a tank-killer based on [T-26](#) components, especially from those T-26's that required repair. It was recommended that the turret and armament be removed, and install the [76 mm F-32 gun](#) (produced by the [LKZ](#)) in an armoured superstructure on the hull. The design was accepted for construction, but the subsequent rapid evacuation of the Izhorskiy, LKZ, and Voroshilov Plants halted work on this project.



Drawing of armoured hull for tank killer series I13.
1942. (M.Svirin)

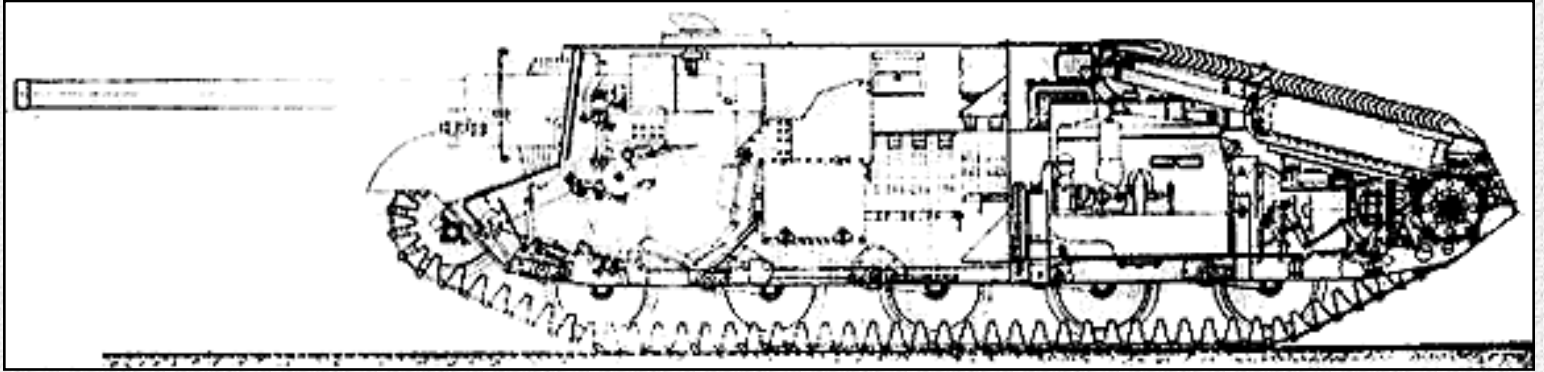
On 3 March 1942, the **NKTP**, on the initiative of the recently appointed Chief of Special Bureau of OGC **NKTP**, S. Ginzburg, embarked upon the creation of light SP-Guns. In the preliminary design, the Special Bureau recommended the use of a unified chassis for the SP-Gun, from components of

the [T-60 Light Tank](#) and cargo trucks. However, a "Hetzer-like" vehicle did not emerge from this combination and the **NKTP** did not return to the design of the SP-Gun until the fall of 1942. As L. Gorlitskiy said, *"We had enough other work at the time."*

However, in April 1942 the NKV launched an initiative for the organization of production of special anti-tank SP-Guns. It is interesting to note that in the allocation of tasks for the development these SP-Guns were labelled "anti-tank assault guns", whose special design features are described below:

- "1. To have the lowest possible silhouette (desired on the basis of the average height of a man).
2. To employ the most inexpensive components of mass production of light tanks, cargo trucks, and prime movers.
3. To have the possibility of mounting serially produced truck engines, as the power plant, from among those easily manufactured by our industry.
4. To have the least possible number of crew, not exceeding 3 men.
5. To have an armament capable of penetrating armour of 50 mm and greater thickness at a range of 500 metres.
6. Frontal armour should ensure the reliable

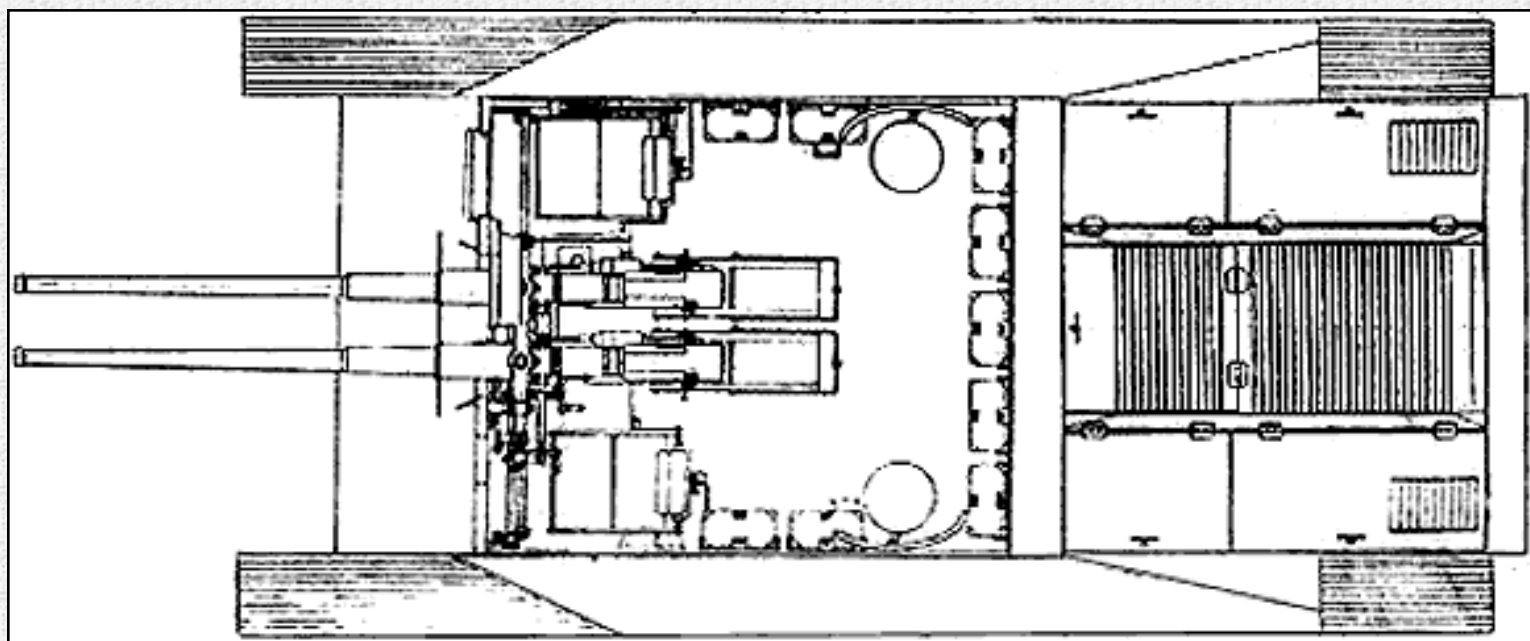
protection of the SP-Gun from 37 mm anti-tank guns at all ranges of effective fire. The sides and rear should protect the crew from large-calibre machine gun bullets, light anti-tank rifles; and fragments from shells, bombs and mines."



Longitudinal cross-section of SU-IT-76. (M.Svirin)

The Design Collectives NII-13, Bauman MVTU, NATI, *TsAKB*, *Uralmash*, and also subsidiary enterprises from *NKTP* (Plant #592, *OKB* #38, and a number of others) were included in the work on this SP-Gun project.

In the summer of 1942, NII-13 presented a preliminary design package of several variants of the tank killer on a chassis made from components of the T-60 and T-70 light tanks. The designs of three of these vehicles differed from each other primarily in armament alone. The unique feature of these SP-Guns was an armoured hull of low height constructed from sheets of rolled armour plates of 35 mm (front) and 15 mm (sides and rear) thickness welded together. The armour had shallow slope angles providing sufficient protection for a small crew (3 men in a standard SP-Gun or 4 men in a command model) from the fire of the German 37 mm anti-tank gun and 50 mm tank gun with the 42-calibre barrel; the most common guns in the German Army up to the second half of 1942. The engine and transmission were borrowed from the ZiS-5 truck, with a recommendation that its output be increased to 108 hp by supercharging. It was interesting that the relatively small size of the fighting compartment should not cause the crew to become fatigued during prolonged travel. The hull roof could be opened sideways, which opened the fighting compartment from above and provided additional sides. These additional sides served as additional protection for the crew from projectiles and shell fragments, while on the move.



Cut-away I13.75-SU. Good view of coupled 45 mm gun and seating for two loaders. (M.Svirin)

The first I13.73-SU vehicle was armed with the 45 mm high velocity gun developed by NII-13 in 1941, which was similar to the M-42 45 mm Anti-Tank Gun later accepted for service.

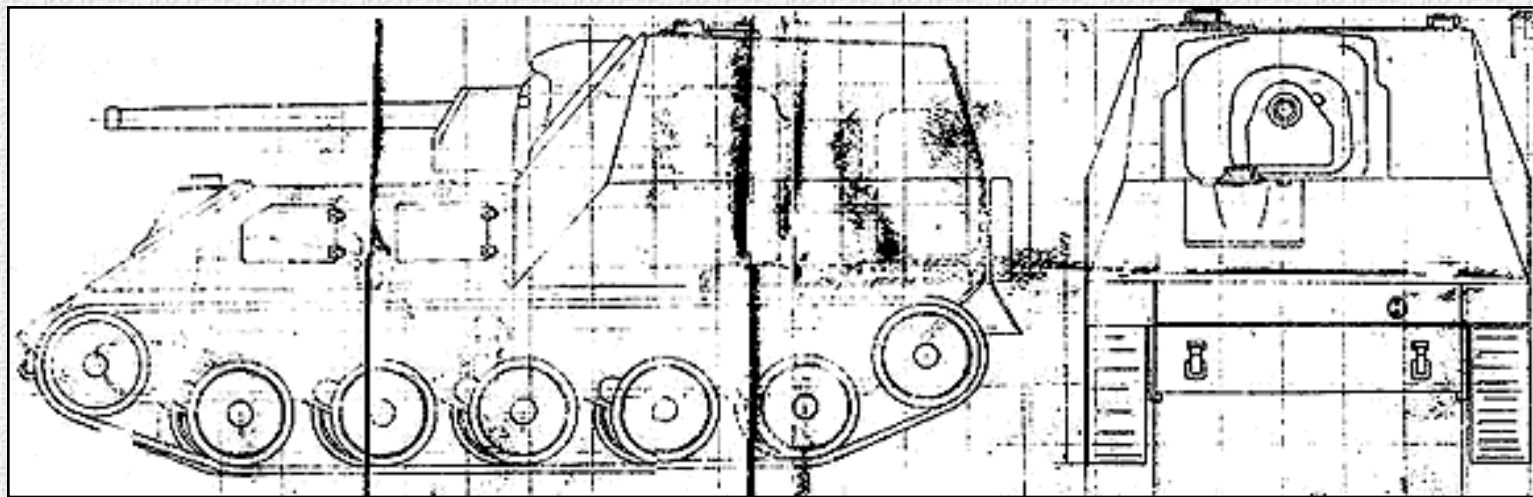
The second vehicle, designated I13.75-SU, was armed with two coupled 45 mm gun of the same type as in the first vehicle.

The third vehicle, designated I13.76-SU, was armed with the 76 mm "self-propelled" gun with a 50-calibre barrel, which had been reconfigured by NII-13 from the F-22 divisional gun.

It was recommended to equip all artillery systems with a "special forked-shaft lightened frame" with anti-fragmentation shield and telescopic sight.

The designs were evaluated at a session of the Technical Council of the **NKV** and in October 1942 the TsAKB was engaged for development of the artillery components, and OKB-33 and KB NATI were engaged for development of the drive train.

The re-worked SP-Gun designs were presented for assessment by the higher leadership in December 1942. J. V. Stalin personally very much liked the vehicle equipped with the 76 mm gun, calling it "extremely interesting." By instruction of the **GOKO** of 16 January 1943, the **NKTP** and **NKV** recommended that test models of two combat vehicles of NII-13 be prepared and delivered for testing by 15 February. These vehicles received the designations SU-IT-45 and SU-IT-76 (samokhodnaya ustanovka - istrebitel tankov [self-propelled tank killer] respectively with 45 mm and 76 mm guns).

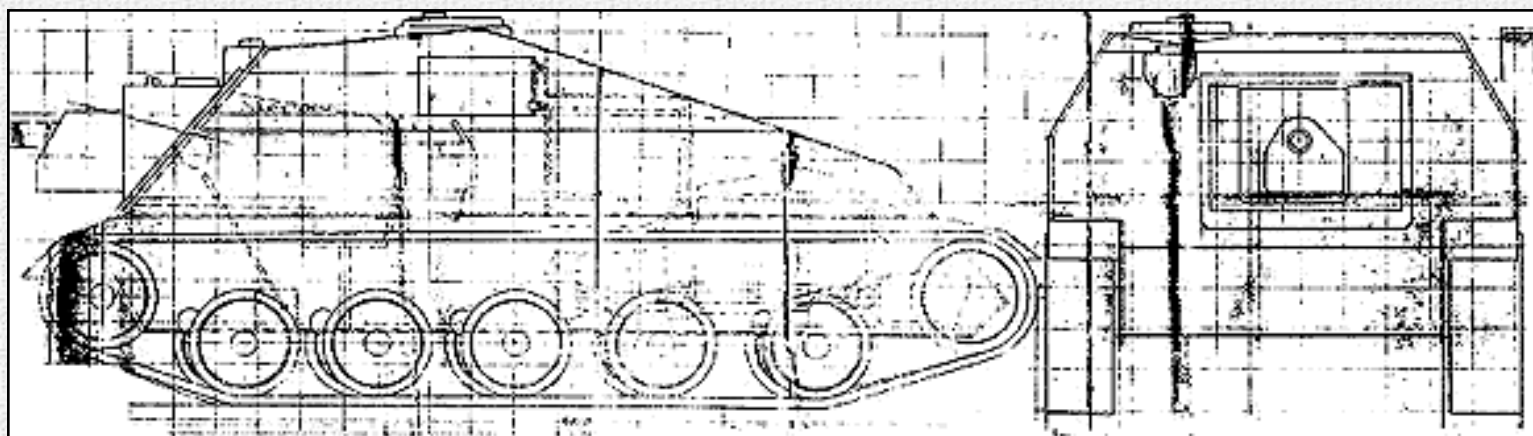


First variant of design for tank killer GAZ-74. (M.Svirin)

In January 1943, it became clear that there were difficulties with the production of the supercharged ZiS-80 engine, and the twin-engined GAZ-203 power pack installed in the T-70 tank could not be installed in the engine compartment of the new vehicles. The engine compartment and transmission had to be redesigned.

True, it was anticipated that soon either the Plant "Dvigatel Revolutsii" ("Engine of the Revolution") or the Yaroslavl Plant would master production of the V-3 diesel or #744 engines, which were in high demand to equip light tanks, SP-Guns, and artillery prime movers. The employment of a diesel with an output of 150 to 250 hp at 1700-1800 rpm. would permit an increase in armour thickness of up to 45 mm (front) and 25 mm (sides and rear) on the SP-Gun. However, the new diesels were not forthcoming, because in 1941-42 these plants were seriously damaged during German air raids, and also were experiencing a severe shortage of qualified staff. The production of American diesels of 110-160 hp in the USSR, under license, had also not yet begun. Therefore, it is understandable that the SU-IT-76 design, more than once reconfigured for various engines, was not completed on time.

In addition, the capture near Leningrad and subsequent testing of the new German Tiger I tank demanded from the designers of the SP-Gun that they consider improving its armament. Upon recommendation of the Chief of the **TsAKB**, V. Grabin, they mounted the simplified 57 mm S-1-57 gun, with ballistics of the ZiS-2, in the vehicle. Calculations showed that a simple exchange of barrel with the new SP-Gun was not sufficient. The design of some of the mount components had to be modified. Therefore, the preparation of a test SP-Gun was halted until the correction of these identified deficiencies, and a new time schedule was agreed upon. In the fall of 1943, the armoured hull of the uncompleted tank killer was sent to the Moscow branch of NII-48, where it was used at the end of the war primarily as a target for testing new captured armour-piercing ammunition.



Second variant of design for tank killer GAZ-74. (*M.Svirin*)

From the fall of 1943, NII-13 did not re-start work on the creation of an antitank self-propelled gun, though several times over the years it attempted to force its "stepchild" to accept it for service.

Following in the tracks of the designers of the **NKV**, to create a special light tank killer, came the designers of **GAZ**, headed by N. Astrov. In the summer of 1943, at the NATI Design Bureau they prepared two designs of armoured SP-Guns, designated on the list of the **NKTP** as "turretless tank killers GAZ-74." These two SP-Guns differed in the layout of the combat compartment. In the first vehicle, - GAZ-74a - the combat compartment was part of the hull of the vehicle, as in the GAZ-71, and already accepted for service SU-12 (better known as the [SU-76](#)), which improved distribution of weight of the SP-Gun on the road wheels and raised its manoeuvrability; , admittedly at the price of a relatively high large silhouette and vehicle weight.

The second variant (GAZ-74b), was similar to the SU-IT-76, recommended by NII-13. The vehicle had a low silhouette, was well-armoured (45mm glacis plate) with sloped armour and was armed with the 76 mm S-1 Gun (the same gun was mounted on the serially produced [SU-76i](#)). The new tank killer was to receive the GMC-71 diesel engine.

The GAZ-74b was built, underwent factory testing, and on the whole was approved by military personnel. Under the designation SU-76-I (not to be mistaken for SU-76i) or SU-74 it was subjected to government tests. However, in 1943 the arming of these vehicles with the 76 mm gun with a long barrel (41-calibres) was already considered inadequate for combat with heavy German tanks. The cost significantly exceeded the that of the [SU-76](#), which was already being mass produced. Therefore, the fate of the GAZ-74b was sealed.



Tank killer GAZ-74 (SU-57b) with S-1-57 57 mm gun.
(M.Svirin)

In the summer of 1943, Gorkiy Artillery Plant #92, at the behest of the Chief of the **TsAKB** V. Grabin and with the support of D. Ustinov, renewed the production of the ZiS-2 57 mm anti-tank gun, and also its ZiS-4 tank variant, which had been halted at the end of 1941. These guns had very good armour-penetration characteristics. This

situation once again spurred designers toward the creation of an anti-tank SP-Gun. Already in early August 1943, an SU-57 vehicle resembling the mass produced [SU-76M](#) with an SU-15-57 57 mm anti-tank gun mounted in place of the standard 76 mm gun, had left Plant #38 for factory testing.

As a result of testing, the SP-Gun was not recommended for acceptance into the Army's inventory. In the first place, it turned out that the recoil length of the 57 mm gun exceeded the norm agreed to by the customer. In addition, the military were motivated to reject the SP-Gun because, in their opinion, a tank killer should have an enclosed armoured hull with shell-proof armour and a diesel engine.

On 29 October 1943, the attendees of MVTU also suggested the design of an armoured tank killer that resembled both the I-13.75-SU and the GAZ-74b. It was recommended that it have a weight of not more than 11 tonnes and receive the GMC-71 diesel engine or the USSR-produced equivalent, the production of which was being actively discussed. The vehicle was to be armed either with the S-1 76 mm gun or S-1-57 57 mm gun. The crew consisted of three men. Despite the fact that all formal military requirements were satisfied by the design, no instructions for its production followed.

At the same time **GAZ** stubbornly continued work on its tank killers. Parallel efforts were made for the creation of a new vehicle, the GAZ-74b with the S-1-57 57 mm long-barrel gun, as well as improving the vehicle by fitting a 76 mm gun (the developers awaited a S-54 high velocity 76 mm gun with 60-calibres long barrel from **TsAKB**).

In order to differentiate between the **GAZ** vehicle (with the 57mm gun) and the SP-Gun from Plant #38; the former was designated SU-57b and the latter SU-57a, on the **NKTP** list. The SU-57a (an SU-76M re-armed with the ZiS-2 gun) was already undergoing tests.



GAZ-76d (SU-80) undergoing mobility testing. (*M.Svirin*)

Despite the fact that the SU-57b passed almost all the recommended tests, it was not accepted for service. Among the reasons for it not being accepted, was the high cost of the SP-Gun and the necessity to produce a new diesel engine that had not been assimilated by Soviet industry (the higher authorities would hardly deem it reasonable to rely on foreign deliveries

during wartime).

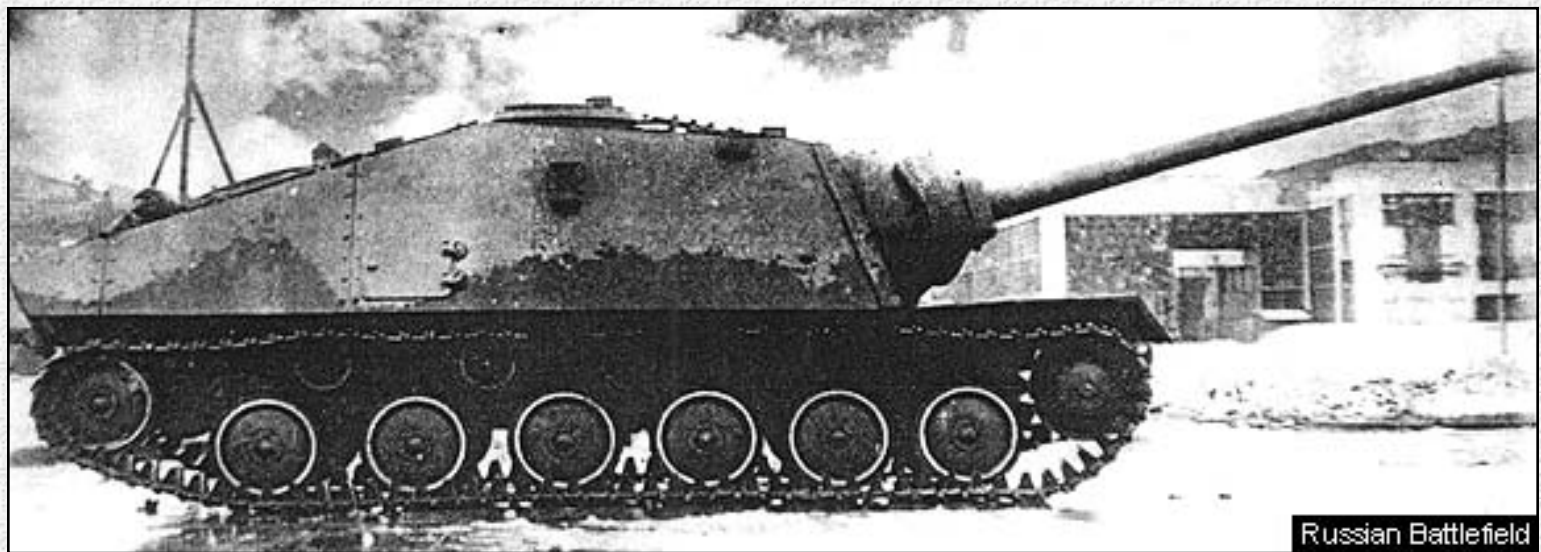
The NATI Design Bureau contributed to the creation of a domestic tank killer. Apparently taking into consideration the work on the GAZ-74, they developed their own variant of the turretless tank killer. It is interesting that the paper design went under the title "hunter" (for comparison, the Hetzer in German was a "jager"- a hunter, one who went out hunting animals). When this tank killer was ready, armed with a 57 mm gun, it underwent testing. However, this vehicle also did not receive the required engine, and differed little in its combat characteristics and price from the GAZ Plant models, which were actively being promoted at all levels. They tested the vehicle and modified it several times, but it was still not accepted for service.

Work to modernise the GAZ-74 that was undertaken in 1944, which led to an improved SP-Gun designated GAZ-76d, or SU-76d ("diesel"). True, the S-54 gun was not ready for it, but the front sloped armour was increased to 60 mm and in this form, with the S-176mm gun, was tested at the Government Trials under the designation SU-80. It was again not accepted for service, because of the lack of clear superiority over the mass produced SU-76, and the use of the imported diesel. Production of imported diesel had not been assimilated either in Yaroslavl or in Miass factories, nor in the Gorkiy Automobile Factory (GAZ), which had been subjected to repeated bombing in 1943.

It is interesting to note that in the beginning of 1945, a Hetzer captured in Hungary was tested alongside a SU-57b. The report of this testing concluded:

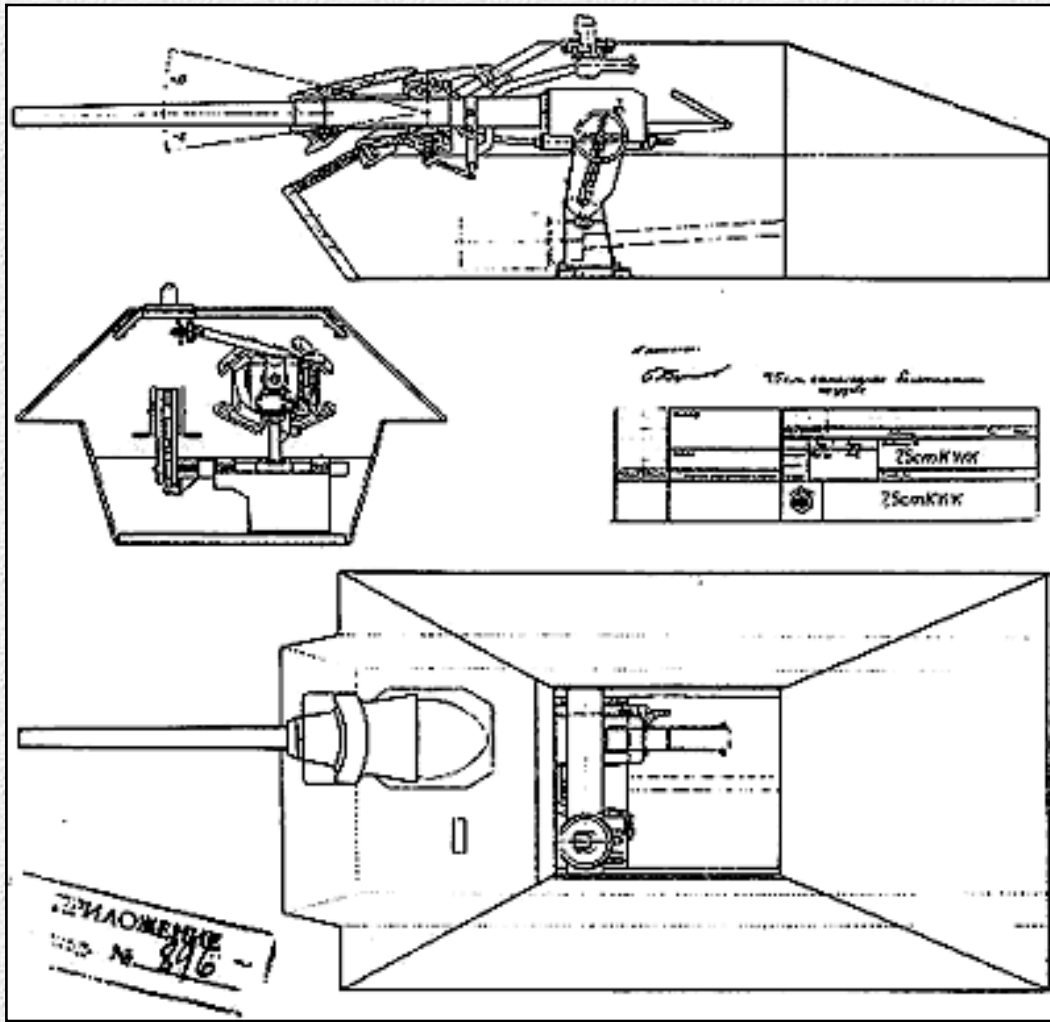
"Thus, German experience of tank destroyer construction shows that the use of small-scale

turretless tanks in modern war has fully justified itself. The comparison of a German turretless tank of the "osa" [although in Russian "osa" sounds like "wasp", this time it means abbreviation from "Obshevoiskovaya Samokhodnaya Artilleriya"- All-Purpose Self-Propelled Artillery - **V.Potapov**] type with the SU-57b from the Gorkiy Factory, which has a similar chassis, shows some advantages over our own vehicle associated with the use of the diesel engine. The mounting of a defensive machine gun on the roof of the tank, with the possibility of conducting fire from behind armour, should be considered a real plus. Among the deficiencies of the SU-57b are the absence of powerful fragmentation or high-explosive fragmentation rounds for the gun."



Tank killer GAZ-75 with S-53 85 mm gun. (M.Svirin)

In the course of 1943-44 works on Soviet "coffins" proceeded to their logical conclusion. This is understandable, because tanks with 85mm guns, whose projectiles possessed greater armour penetration capability and more powerful high explosive effects, were already accepted for service. However, the primary reason for failure to accept these vehicles for service was, that the requirement for equipment of such clear defensive capabilities was not so acute as it had been in 1941-42.



Design of tank killer based on the German Hetzer-Starr. (M.Svirin)

In the closing moments of this episode, the Gorkiy designers created yet another self-propelled tank destroyer, the GAZ-76, which became - as it were - the last crowning achievement among Soviet "Hetzers." It is interesting that, with a combat weight of not more than 18 tonnes, the GAZ-75 carried frontal armour of 75 - 90 mm thickness (the mass produced [SU-85](#) had 45 mm) and was armed with the same 85 mm gun as the [T-34-85](#) and the SU-85. The positioning of the combat compartment in the middle of the SP-

Gun improved the weight distribution on the road wheels and improved the vehicle's mobility on cross-country terrain. The good transmission of the SP-Gun made it exceptionally mobile, both on hard-surface roads and off roads. However, this SP-Gun also did not accept for service.

In 1945, a large quantity of uncompleted design material relating to future types of military equipment was being worked on in fascist Germany fell into the hands of Soviet forces. Among this material was a very interesting project named the "Hetzer Starr." This design differed from the standard Hetzer by replacing the original gun mounting by one rigidly mounted in the hull. In the opinion of the German designers, this permitted the abandonment of anti-recoil devices, economy of interior space in the combat compartment, and also somewhat increased the rate of fire of the main gun. Our own specialists also considered the low production cost of this system as a real advantage.

Therefore, in 1945 the decision was made to create a special design group made up of German specialists for the study and delivery of a design for possible use by the

Soviet Army. This SP-Gun design was completed in 1946 and, by some sources, led to the development of a test model. It is interesting to note that M. N. Shchukin (main designer of OKB-38) was one of the chairmen of the mock-up commission of this department.

Work on the SP-Gun was halted, because the 75mm anti-tank gun was clearly already insufficiently powerful to combat enemy tanks. The employment of a more powerful gun was problematic, because of the effect of its recoil on the drive train and hull of the SP-Gun. The more so, because the high power recoilless gun had by this time appeared.

REFERENCES:

[Specifications of Soviet tank guns](#)

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Sources:

"Poligon", #3, 2001;

"Artilleriskoe Vooruzhenie Sovietskikh Tankov", Armada-Vertical #4, 1999.

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The T-34M Experimental Tank

◀ [MAIN MENU](#) [SOLDIERS AT](#)

[WAR](#) [DOCUMENTS](#) [BATTLES](#) [TANKS](#) [ARTILLERY](#) ▶



In January 1941 the GOKO approved the A-43 project (a modernised variant of the T-34, also known as the T-34M) and the production of the first two prototypes of the T-34M were planned for March 1941.

Proposed, that new tank will be superior to production T-34. It's seems, that this superiority played a negative role in its fate.

A new V-5 diesel engine was developed specially for that tank. The worth that it was turned on 90 degrees to main axis of tank. It was used before on several light tanks but such layout wasn't effective for weak engines. Another matter with long, narrow but powerful V-2 engine. With perpendicular layout the total length of vehicle become smaller, so the ammunition storage could be increased.

The four-speed gearbox was left unchanged, but it was equipped with a new de-multiplier, so the T-34M had 8 front gears and 2 reverse gears. The Christie suspension was replaced by torsion bar suspension which resulted in the ground clearance of the T-34M being increased by an additional 50 mm.

The tank had a pressed turret with



The wooden mockup of the T-34M

a commander's cupola and two rounded hatches. Initially the turret had been designed for the A-41. The radio was relocated from the turret to the hull, allowing the ammunition load to be increased from 77 to 100 anti-tank shells, and from 2,898 to 4,536 MG rounds.

V.S.Nitsenko's designer group in the Mariupol factory had developed the turret with 45 mm armour thickness. By May 1941 the factory had produced five of these turrets

and was preparing for mass production. When the factory was evacuated in autumn 1941 it had produced 50 pressed turrets for the T-34M and had also started the production of 52 mm cast turrets for the T-34/76.

The following order is a reflection of all the disputes surrounding the T-34 and T-34M. The Central Committee of the Communist Party issued this order on May 5, 1941:

"1. To affirm the following annual plan for 1941:
a. tanks - 2800, of which for factory #183 - 1800
and for STZ - 1000.

...

2. Require Comrade Malyshev and director of factory #183 Comrade Maksarev to add the following improvements to the T-34's design:

a. increase the frontal armour of the turret and glacis to 60 mm;

b. use torsion bar suspension;

c. expand the diameter of the turret ring to no less than 1600 mm and install a commander's cupola on the turret;

d. install vertical side armour belts and increase their thickness to be equivalent to 40 mm thickness sloped at 45 degrees.

3. Fix the full combat weight of the improved T-34 tank: 27.5 tonnes.

4. Require Comrade Malyshev and director of factory

#183 Comrade Maksarev to maintain the production of 500 improved T-34 in 1941."

To all appearances, this document is about the T-34M which was ready for mass production. KhPZ had produced three hulls of the T-34M by April 17, 1941, and it was ready to produce the improved chassis with torsion bar suspension. However the V-5 diesel engine wasn't ready, so final assembly of the T-34M was firstly delayed and then, after the beginning of the Great Patriotic War, it was abandoned completely.

Sources:

"About manufacturing of the T-34 tanks in 1941" AP RF. F.93. Document collection;

Bronekolleksiya #3, 1999;

I.Shmelev "The T-34", Technics and Armament #11-12, 1998

This page belongs to [The Russian Battlefield](http://www.battlefield.ru/t34m.html)



The T-34-100 Experimental Tank

◀ [MAIN MENU](#) [SOLDIERS AT](#)
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The T-34-100 with the 100 mm gun ZIS-100 mounted in the standard turret of the T-34-85. Winter 1944-45.

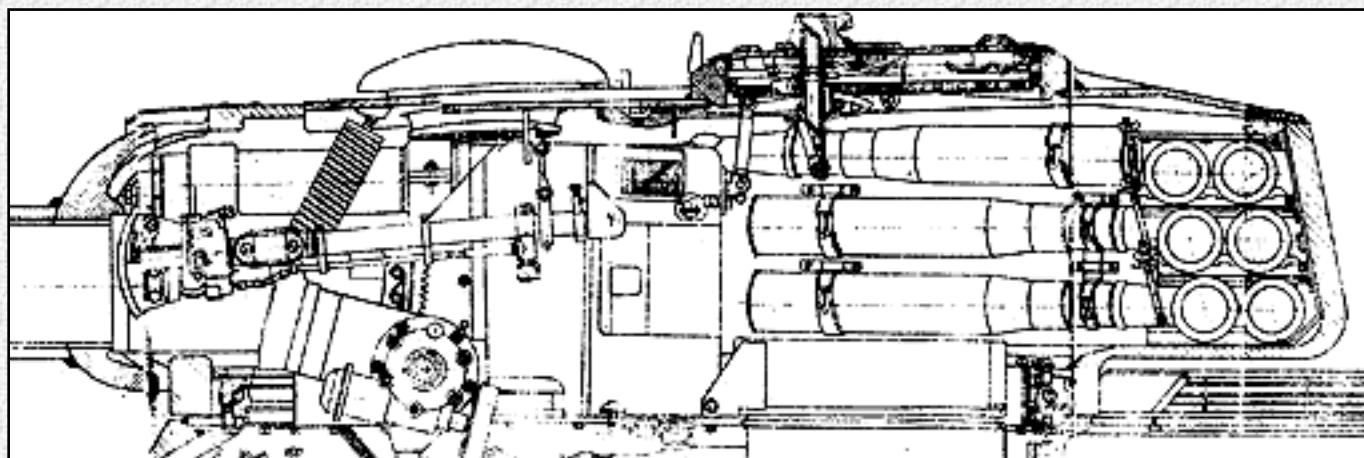
Using war experience the T-34 was modernised several times. Some of these modernisations were accepted for service, others weren't. As reserves of the basic T-34 dwindled. This was especially when Soviet engineers tried to mount a new more powerful armament on the T-34. To install a 85 mm gun, a new turret has been developed. Even more troubles happened when Soviet engineers tried to mount a 100 mm gun onto T-34-85. In July of the 1944, simultaneously two design bureaus were ordered to do this: the KB #92 and the KB of the factory #183 ("KB" means design bureau). Despite big technical problems (the standard diameter of the turret ring was insufficient), the KB#92 led by A.Savin was able to solve this problem. They are offered to install their own 100 mm gun ZIS-100. This gun was based on the 85 mm gun ZIS-S-53.

All attempts to install a more powerful gun failed. In 1945 Soviet engineers attempted to rearm a T-34-85 with a 100 mm D-10-34 gun. At least two prototypes were built: the first one with a 100 mm gun mounted on a standard turret of the T-34/85; and the second one with a 100 mm gun mounted on a new, larger turret. To install this turret the hull was also slightly improved.



The T-34-100 with the 100 mm Gun ZIS-100 mounted in the large turret.

At least two prototypes existed: the T-34-100 with the standard turret of the T-34-85 and the T-34-100 with a new, larger turret. To install this turret the hull was also altered, for example, the turret ring was increased to 1700 mm and the bow machine-gun was removed. Proving ground trials however, revealed a big problems concerned with the extra load onto the running gear during the shooting.



The mount scheme of the 100 mm Gun D-10-34 in the large turret of the T-34-100.

Besides the ZIS-100, the 100 mm D-10-34 was tested with the T-34-100. In February-March 1945, this tank was tested on the Gorokhovetskij and the Sverdlovskij proving grounds. Trials revealed the low accuracy of the gun due to overloaded chassis of the vehicle. However, the Soviet military liked this tank anyway because they are always looked on the German 8,8 cm PaK 43. That's why works continued. However all attempts to reduce the recoil force and therefore to increase the gun accuracy failed.



The T-34-100 with the LB-1 gun mounted in the large turret.

The next attempt to mount a 100-mm gun onto the T-34 was offered by engineers of the KB #92 and engineers of the Special KB. They are offered a 100 mm gun LB-1 to be mount on the T-34-100 with the large turret. This gun was developed by these KBs and was of reduced recoil force. Trials showed good stability of the tank during shooting, low recoil force of the gun and therefore good accuracy. The T-34-100 armed with the LB-1 was recommended to accept for service. However, the time of the T-34 run out and, in March 1945, the first prototype of the T-54 tank was introduced for trials. That is why all further works with T-34 were cancelled forever.



The T-54 with the 100 mm Gun LB-1. Spring 1945.

Sources:

"Report about trials of the T-34 with 100 mm guns", NKTP, 1945;

"Armament of the Soviet tanks 1940-1945", Armada #4, 1999;

I.P.Shmelev "The T-34", Technics and Armament 11-12, 1998;

"Bronekolleksiya" #3, 1999.

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The T-43 Experimental Tank

◀ [MAIN MENU](#) [SOLDIERS AT](#)

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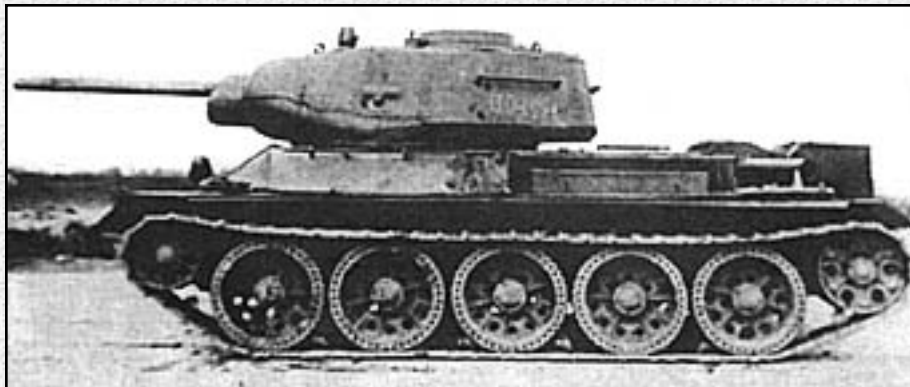
The T-43 medium tank

By the middle of the war it had become clear that the Red Army did need a new medium tank. The military demanded a tank with maximum protection and minimum weight at the same time. These demands were implemented and the new medium tank project was completed by June 1943 under the name of T-43.

The T-43 had a configuration like the T-34, its glacis consisted of 75

mm of armor, and its turret front of 90 mm. The tank was armed with the 76.2 mm Tank Gun F-34. However, the total length of the engine & transmission compartment wasn't reduced, therefore the battle compartment remained very cramped. To increase internal space Soviet designers applied a torsion bar suspension which was more compact than the original Christie "candle" suspension. It was the first time that a torsion bar suspension was used for medium tanks.

Beginning in March 1943, two T-43 prototypes (preceded by vehicle T-43-1, which was built at the end of 1942. It possessed a driver's vision hatch, and had the commander's cupola displaced to the rear of the turret.) underwent trials.



T-43 medium tank

These included combat trials with the NKSM Independent Tank Company. These showed that the T-43, because of its increased 34.1 ton weight, was marginally inferior to the T-34 in its ability to maneuver (maximum speed was decreased to 48 km/h). It did, however, significantly surpass the latter in smoothness of ride. The

replacement of the eight side fuel tanks (on the T-34) for a smaller capacity fuel tank in the bow resulted in almost a 100km decrease in the radius of action. Tank crews

praised the crew compartment and greater ease in operating the armament. After trials, the T-43 tank was recommended for acceptance by the Red Army at the end of the summer of 1943, but the results of the Battle of Kursk significantly altered this plan.

The armor protection was superior, compared to the T-34, while its armament was similar with the [KV-1S](#) heavy tank. However, the T-43 had a ground pressure like heavy tanks that adversely affected its range and passability, but even worse was its extreme construction, i.e. it didn't allow further modernisation. So, when production T-34's were rearmed with the 85 mm gun, the T-43 became obsolete. However, experience with the T-43 didn't get lost. The T-43's tests (3,000 km race) had clearly proved the superiority of the torsion bar suspension over the Christie's.

REFERENCES:

[Blueprint of the T-34](#)

[Specification of Soviet tanks](#)

[Specifications of Soviet tank guns](#)

Proof-reader:

[Mark Jaremco](#)

Sources:

S.Gryankin "The T-44", a historical issue in the "Tankomaster"

"Soviet tanks in combat 1941-1945. The T-28, T-34, T-34-85 and T-44", Concord publications company

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Experimental KV Tanks

◀ [MAIN MENU](#) [SOLDIERS AT WAR](#) [DOCUMENTS](#) [BATTLES](#) [TANKS](#) [ARTILLERY](#) ▶

Note: All Russian terms and abbreviations marked as *red italic* are described in the [Glossary](#).



Already in the summer of 1940, after the beginning of mass production of the KV tank, the issue arose concerning the strengthening of the tank's armor. On 17 June 1940, the *SNK* of the USSR and the *TsK VKP(b)* adopted resolution No. 1288-495ss, which said in part,

"By 1 November 1940, the Kirov Plant is to prepare two KV tanks with 90 mm armor. One of them will have the F-32 76 mm main gun, the other an 85 mm main gun. One hull will be delivered from the Izhorsk Plant at the end of October and the preparation of this tank is to be completed by 5 November. The second hull will be completed in November.



T-150 tank view from above and behind. Externally it differed from the production KV-1 by the presence of the commander's cupola with periscope and three vision blocks. (M.Kolomiets)

By 1 December 1940 the Kirov Plant is to prepare two KV

tanks with 100mm armor. One will have the F-32 76mm main gun, the other the 85mm main gun. One hull will be delivered at the end of October, the other in November."

However, the deadline was not met. The plant delivered one KV with 90mm armor and the F-32 main gun on 5 November (in documents it is referred to as "tank T-150" or "Object 150"), and one KV with 100mm armor and the 85mm main gun on 5 December (in documents referred to as "T-220" or "Object 220").

KV-3 Heavy Tank and KV-220 Heavy Breakthrough Tank

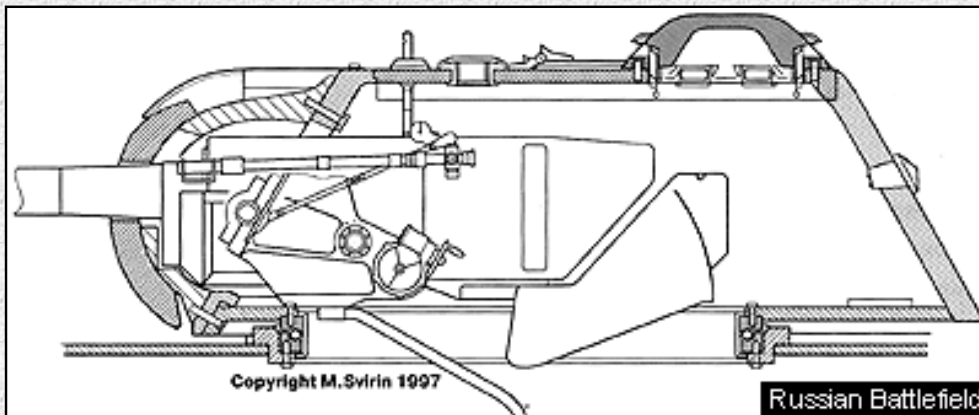
The T-150 was constructed on the base of the production KV and differed from it only in the magnitude of thickness of the hull armor, which had been increased from 75 to 90 mm. Because the thickening of the armor plates was accomplished externally, all the internal dimensions of the vehicle remained unchanged. In addition, the T-150 had modified mounting brackets for the chassis components and a commander's cupola with periscope and three vision blocks. In connection with the increase in the tank's weight, which had reached 50 tons, a V-2 Engine whose output had been boosted to 700 h.p. was installed.

From 15 January to 14 February 1941 the vehicle underwent range testing (199 km total movement), which exposed a number of substantial deficiencies in the functioning of the engine. For example, during movement on a hard-surface road in 3d and 4th gear, at ambient air temperatures of -9° to -12° the lubricant in the engine became overheated. For this reason the tank was withdrawn from testing, and the Kirov Plant and Plant No. 75 in Kharkov were directed to improve the cooling system and increase the temperature drop of the lubricant that passed through the engine.

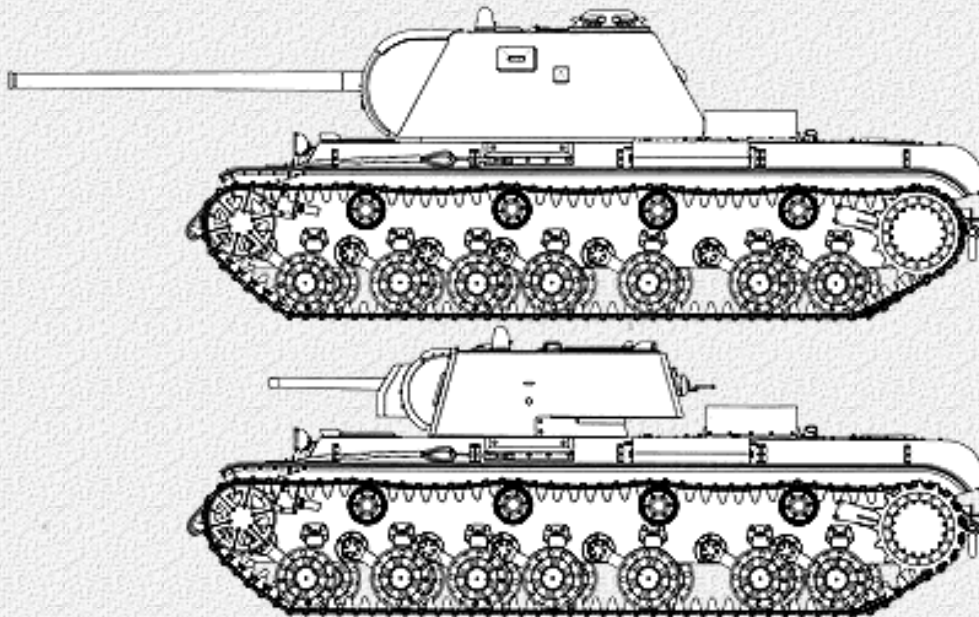


Wooden mockup to full scale of KV-3 tank with ZIS-6 107 mm Cannon.

The KV-220 externally differed from ordinary KVs by the greater length of the hull, an increase of one support roller in the track, and a new turret with the 85 mm F-30 main gun. The weapon was



Mount for F-42 107mm cannon in turret of KV-3 tank. (M.Svirin)



Above: KV-3 with 107mm cannon (proposed); below: KV-3 (with KV-1 turret) that went to the front in 1941. (M.Magilnov)

90 mm, armament - one F-34 76 mm main gun, three DT machine-guns, one PPSH submachine-gun, 114 main gun rounds, 2900 machine-gun cartridges, maximum road speed - 35 km/h, cross-country speed - 15-20 km/h, maximum slope gradient - 40 degrees, range - 250 km (10 hours), V-5 engine with 700 h.p., turret with commander's cupola, KRSTB radio set (with mounting of 71-TK-3 possible), and a guaranteed vehicle life of 2,000 km."

specially designed for arming this tank in the design bureau of Plant No. 92, under the supervision of Grabin. It was tested successfully in the T-28 tank in the fall of 1940. Because of the steep growth in the weight of the tank, which now reached 62 tons, the V-5 engine with 700 h.p. was mounted.

Testing of the KV-220 commenced on 30 January 1941 and was halted the very next day because of engine failure.

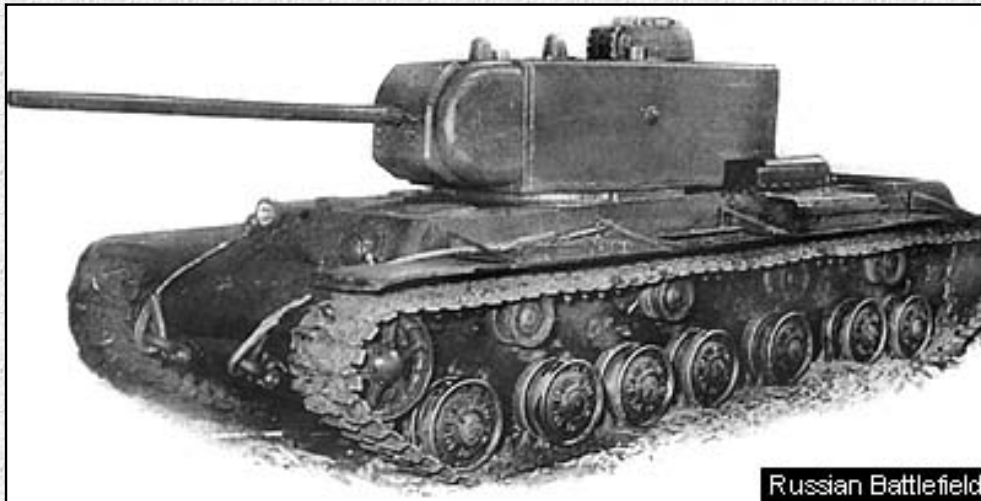
On 15 March 1941 the **SNK** and **TsK VKP(b)** by their resolution No. 548-232ss required the Kirov Plant to transition to mass production of the T-150 tank in June under the designation KV-3. The following technical specifications were established:

"Combat weight - 51-52 tons, length - 6.76 metres, width - 3.33 metres, height - 3.0 metres, ground clearance - 0.4 metres, armor -

In contrast to artillerymen, tankers were falling far behind in the development of a new heavy tank. Therefore they decided to employ the KV-220 (the more so that they were much alike they were much alike they were much alike in construction) to accelerate the work of testing the new assemblies and aggregates of the KV-3. On 20 April 1941 a new engine was finally mounted in

the KV-220 and the tank, loaded up to 70 tons, the loaded weight of a KV-3, was submitted for testing. By the end of May 1941 it had been driven 1330 kilometres. In the report of the plant test personnel it was noted that the tank had *"a poor-shifting transmission, the support roller spindles and suspension arms had bent, the torsion bars had twisted, and the engine lacked sufficient power for a 70-ton tank."*

On 20 May the KV-220 was brought in for repair, in the course of which the vehicle received a V-2SN Diesel Engine with supercharger producing 850 h.p. The tank was subjected to testing again beginning on 30 May and by 22 June 1941 had traveled a total distance of 1,985 km. But because of problems that arose during the preparation of the forged turret, the work period was extended.



KV-220 tank. Note the cupola for AA machine-gun.

(I.Zheltoy)

The plant began preparation for mass production, but fate intervened. In fact, in March 1941 the command of the Red Army received intelligence information that work was being completed in Germany for the creation of tanks with heavy armor, and they were already being issued to the forces. These intelligence reports especially emphasized that Soviet tank and antitank cannons would not be able to defeat their armor. Much later it became clear that

Soviet intelligence had fallen victim to German disinformation, that none of this corresponded to reality. The Germans were not at this time involved in the development of heavy tanks. The following was quickly realized: in the spring of 1941 the German "Panzerwaffe" began to receive captured French V-1 tanks, which had 80 mm armor. In addition, experience showed that the French V-1 and British "Matilda" were destroyed by the fire of the German antitank cannon (much later it became clear that they were not antitank cannons, but the Flak-18 and Flak-36 88 mm AA-gun). It seems that this was the cause of rumors regarding "the new German tanks with heavy armor."

But then the higher leadership of the USSR and Red Army, made uneasy by this information, decided to undertake adequate measures. On 7 April 1941 the **SNK** and **TsK VKP(b)** adopted resolution No. 827-345ss, in which new parameters for the KV-3 tank were specified, and established the design requirement for the KV-4 and KV-5 super-heavy tanks. On 9 April this resolution was enlarged upon by the broader Order No. 231 to the People's Commissariat of Heavy Machine Building:

"Regarding the KV-3 Tank.

1. In modification of **SNK** and **TsK VKP(b)** Resolution No. 548-232ss of 15 March 1941, I order:

a) the front-slope armor of the KV-3 to be 115-120 mm and the turret armor to be 115 mm;

b) the KV-3 will be armed with the ZIS-6 107 mm Cannon with a muzzle velocity of 800 m/s;

2. The KV-3 turret is to be formed from forgings with slope angles not less than 30 degrees under the mount for the ZIS-6 107 mm Cannon. The director of the Kirov Plant, Comrade Zaltsman will:

a) by 15 April 1941, together with the Izhorsk Plant, prepare and deliver to the Izhorsk Plant drawings (blueprints) for the modified KV-3 turret and hull;

b) by 25 April 1941, together with the Izhorsk Plant, present for approval of the NK0 a mockup of the KV-3 turret.

3. The Kirov Plant will establish a plan for production in 1941 of 500 KV-3 tanks with the ZIS-6 107 mm Cannon.

4. The director of the Kirov Plant, Comrade Zaltsman, is to keep in mind and consideration that:

a) the Izhorsk Plant is obligated to deliver to the Kirov Plant by 20 May 1941 the first forged turret and KV-3 tank hull with full mechanical assemblies and artillery system armor protection. Subsequently, the Izhorsk Plant is responsible to ensure the production and assembly of these turrets and hulls in accordance with the schedule for the output of the KV-3 tanks that has been approved by the Government;

b) The **NKV** (Comrade Vannikov), Plant No. 92 (Comrade Yelyan), and the Chief Designer of Plant No. 92 (Comrade Grabin), along with the Kirov Plant, are required to develop the drawings for the mounting of the ZIS-6 107 mm Cannon in the KV-3 turret and present them to the **NKO** for approval by 30 May 1941;

c) Plant No. 92 is required to deliver to Kirov Plant by 25 May 1941 a ZIS-6 107 mm Cannon with mounting parts, mount it in a KV-3 turret, and along with Kirov Plant develop the armor protection for this system;

d) Plant No. 92 of the **NKV** is required to deliver to Kirov Plant ZIS-6 107 mm Cannons for the 1941 program by the following schedule:

July - 45
August- 80
September - 110
October - 110
November - 110
and by 15 December - 65.

Regarding the KV-4 tank.

The director of Kirov Plant, Comrade Zaltsman, is required to:

1. Design and produce in accordance with tactical requirements, approved by the **NKO**, a KV-4 tank (with lengthened hull), armed with the ZIS-6 107 mm Cannon and basic armor of 125-130 mm. Consider the possibility of increasing the armor thickness in the most vulnerable areas to 140-150 mm.
2. Produce one test model by 1 October 1941, in anticipation of which:
 - a) prepare and deliver drawings for the hull and turret of the KV-4 to the Izhorsk Plant;
 - b) present for approval to the **NKO** a mockup and technical proposal for the KV-4 tank by 15 June 1941;
 - c) factor in that the Izhorsk Plant is required to produce and deliver to the Kirov Plant a KV-4 tank hull and turret by 15 August 1941.

Regarding the KV-5 tank.

The director of Kirov Plant, Comrade Zaltsman, is required to:

1. Design and produce a KV-5 tank by 10 November 1941. Carry out the development of the tank hull construction and forged turret together with designers of the Izhorsk Plant, based upon the following basic characteristics of the KV-5:
 - a) frontal armor of 170 mm, side armor- 150 mm, turret- 170 mm;
 - b) armament-ZIS-6 107 mm Cannon;
 - c) engine- 1200 h.p. diesel;
 - d) width not to exceed 4.2 metres.

During the construction consider the possibility of

transporting this tank by railroad during all conditions of movement.

2. Produce and deliver to the Izhorsk Plant drawings for the KV-5 hull and turret by 15 July 1941.

3. Present for approval to the **NKO** and **GABTU** a mockup and technical proposal of the KV-5 by 1 August 1941.

4. Factor in that the Izhorsk Plant is required to produce and deliver a KV-5 hull and turret to the Kirov Plant by 1 October 1941.

Artillery armament of the KV-3, KV-4, and KV-5 tanks.

1. The director, Plant No. 92 (Yelyan) and the Chief Designer Comrade Grabin are responsible to develop the 107 mm Tank Cannon with muzzle velocity of 800 m/s, utilizing a fixed shell with an armor-piercing projectile of 18.8 kg weight. They will prepare a developed design, test, and deliver a test model of this cannon by 1 June 1941 for testing in the KV-2 tank.

2. The **NKO** is required to:

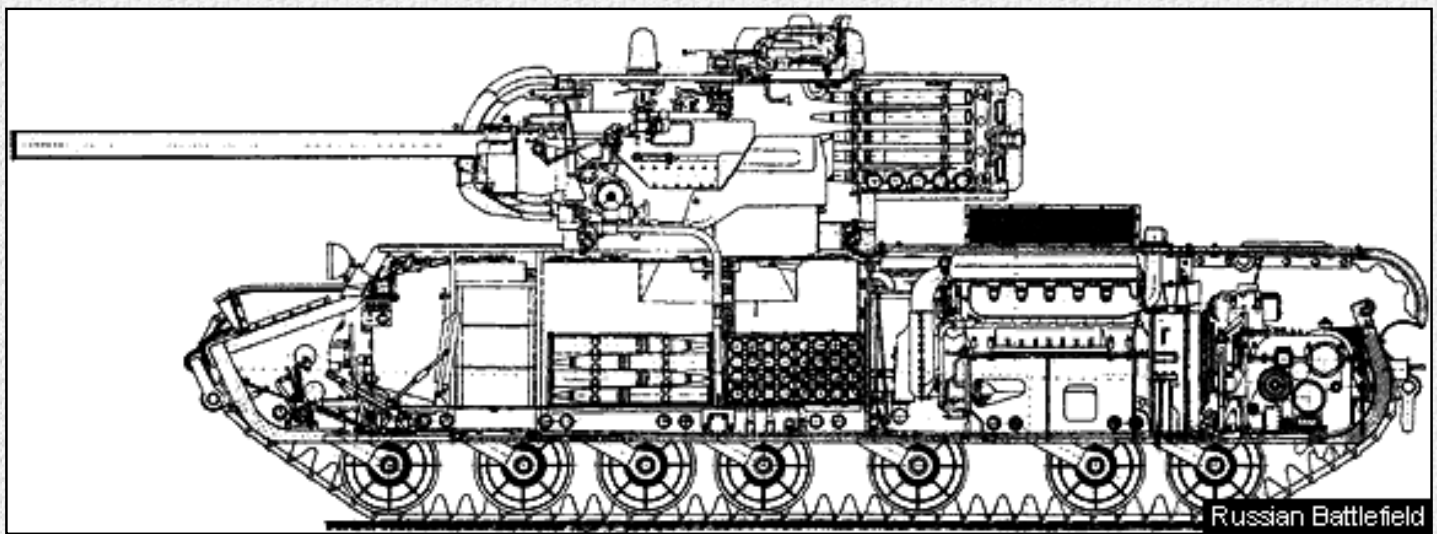
a) develop a round with armor-piercing and high-explosive fragmentation projectiles by 1 June 1941;

b) produce 200 rounds with proof-testing projectiles (to test the mounting and recoil systems) by 15 May 1941, 2000 rounds with high-explosive fragmentation projectiles by 10 June 1941, and 500 rounds with armor-piercing projectiles by 15 June 1941.

3. The director of the Kirov Plant is to design and produce for KV tanks two 1200 h.p. diesel test engines on the base of the M-40 or M-50 engine by 15 October 1941. Be advised that an analogous tasking has been given to Plant No. 75 of the **NKSM**.

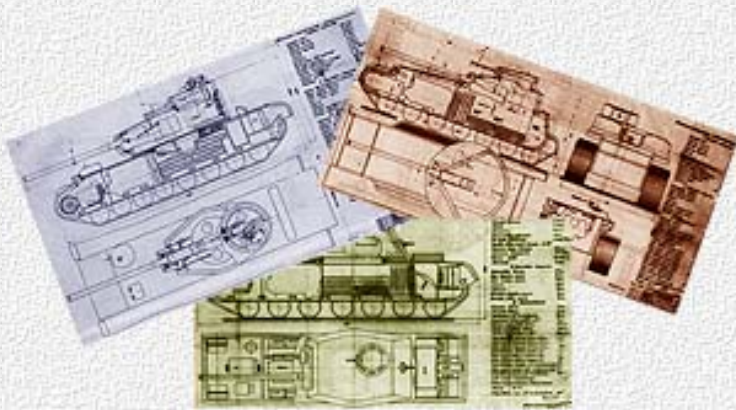
Peoples' Commissar of Heavy Machine Building /signature/

Here it is interesting to add that after beginning of the Great Patriotic War an analysis of the non-combat losses of KV tanks shows that they were equal to combat losses. Among the leading causes was breakdown of overheated engines and transmissions. Therefore during the design of "Object 223" (KV-3) it was particularly voiced that a new transmission should replace the old (for exchange in the future on KV-1 tanks). Unfortunately, the new transmission could not be created in time.



Layout of the KV-220: copy from plant drawing.

KV-4 Super-heavy Breakthrough Tank

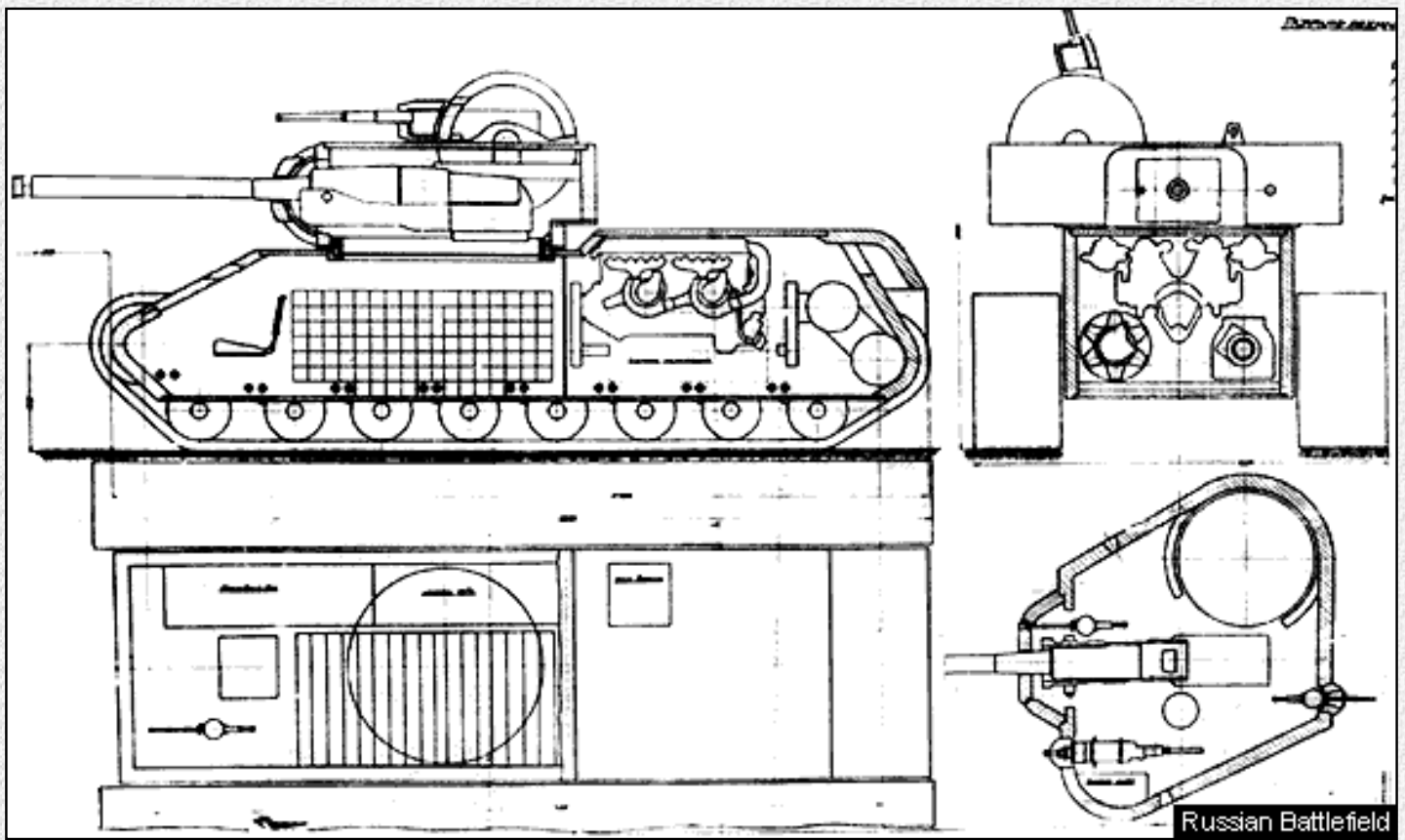


A total of approximately 20 various designs were found for the KV-4 tank.

Designers began to work on the KV-4 design in April 1941. Since the Kirov Plant did not have experience in this area, the chief of the **SKB-2**, Zh. Kotin, assigned almost all the engineers of his design bureau to the design of this tank and placed it on a competitive basis.

All the designers addressed this assignment with great enthusiasm. Their task was sufficiently difficult: the mounting of two cannons and 125-130 mm armor that had never been employed before on Soviet tanks led to the necessity to

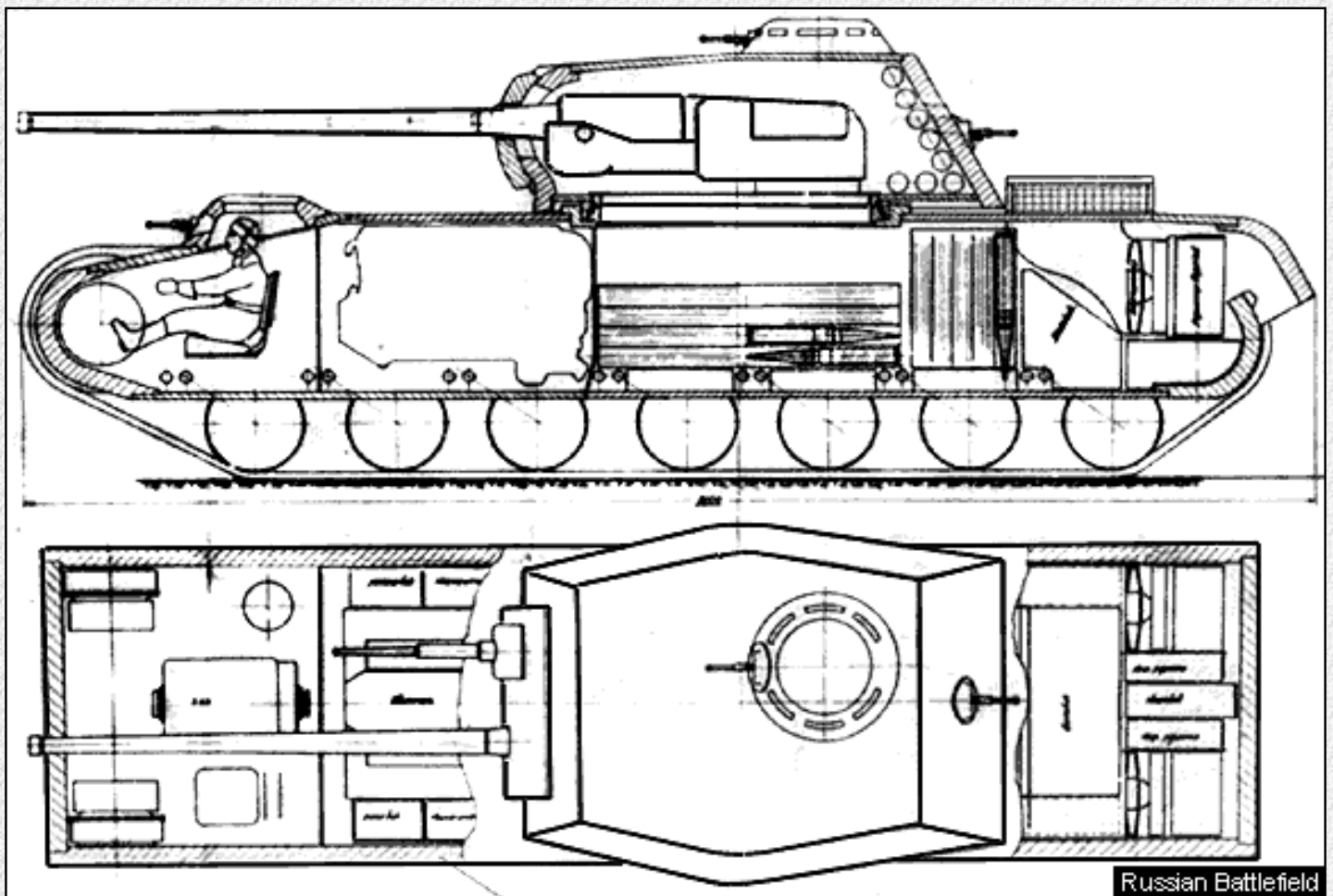
strengthen the chassis and conditioned a sharp increase in the weight of the tank. The creative thought of the participants in the design was not limited, and the designers took advantage of this. In consideration of the required specifications, they developed and put forth a relatively diverse spectrum of ideas. They considered the design of 80-, 90-, and even 100-ton tanks. The lightest of the designs was submitted by engineer N. Dukhov- 82.5 tons. The heaviest was by the designer G. Kruchenykh- 107 tons.



KV-4 tank design of engineer S. Fedorenko. Photocopy of drawing.

The layout decisions were also very diverse. Designers K. Buganov, G. Kruchenykh, F. Marishkin, G. Moskvina, N. Strukov, and S. Fedorenko, each working on his own design, suggested single-turret variants of the heavy tank with the mounting of the 107 mm Tank Cannon in the main turret, and a 45 mm Tank Cannon in a small turret located above the main turret, a "second floor" as it were.

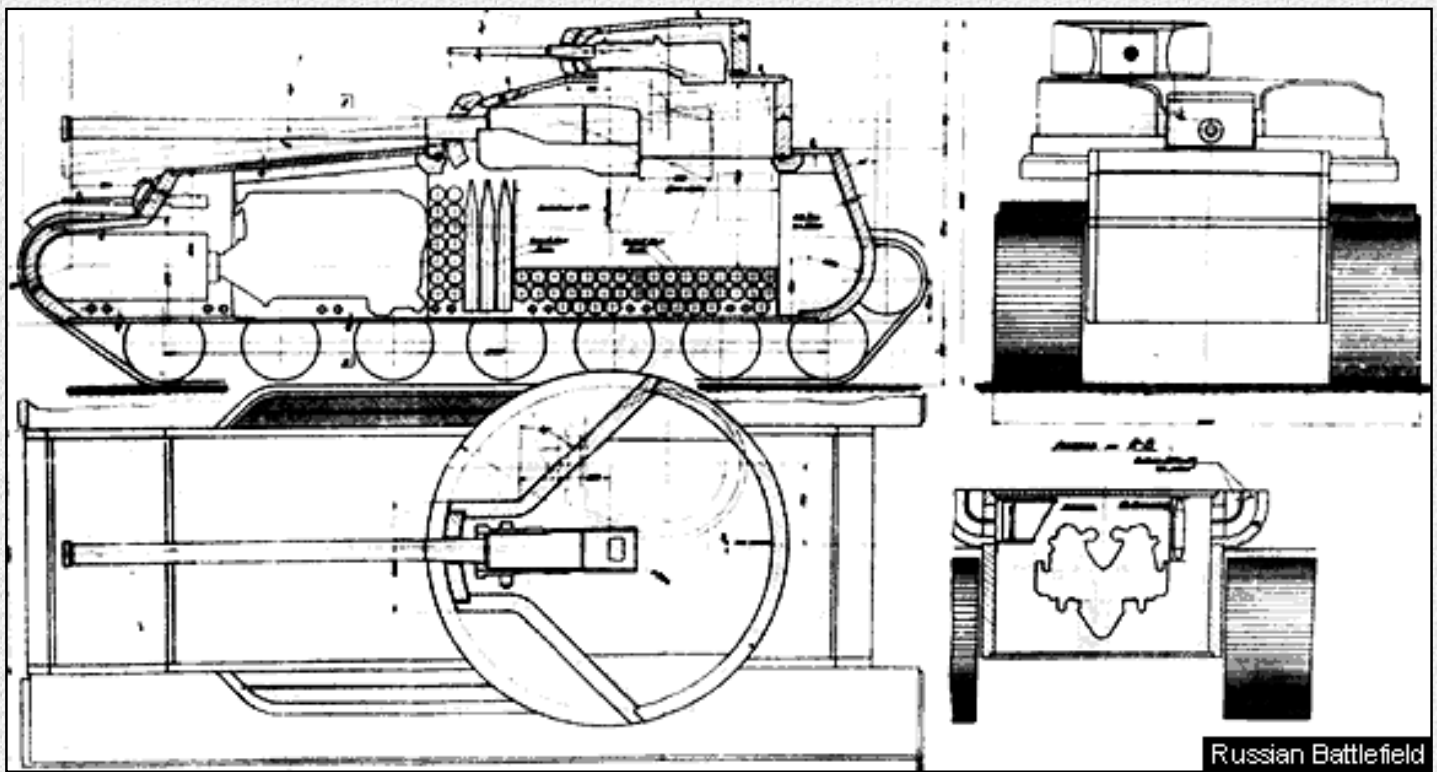
Designers A. Yermolaev, L. Sychev, L. Pereverzev, Bykov, and two workers whose signatures are missing from the working drawings, suggested a two-turret variant of the tank with the mounting of a 107 mm Cannon in a large central turret, as on the SMK tank, and a 45 mm Gun in a separate turret located in the bow portion of the hull.



KV-4 tank design of engineer M. Kreslavskiy. Photocopy of drawing.

Designers N. Dukhov and M. Kreslavskiy in their designs recommended pairing the guns in one turret, and engineer N. Shashmurin proposed mounting the 107 mm Cannon in a casemate fashion in the hull on a pedestal with a 30-degree angle of firing to the horizon. This designer foreswore the 45 mm Gun and in its place mounted a 76 mm Gun in a production KV-1 tank turret on an enormous hull with significantly lengthened chassis components.

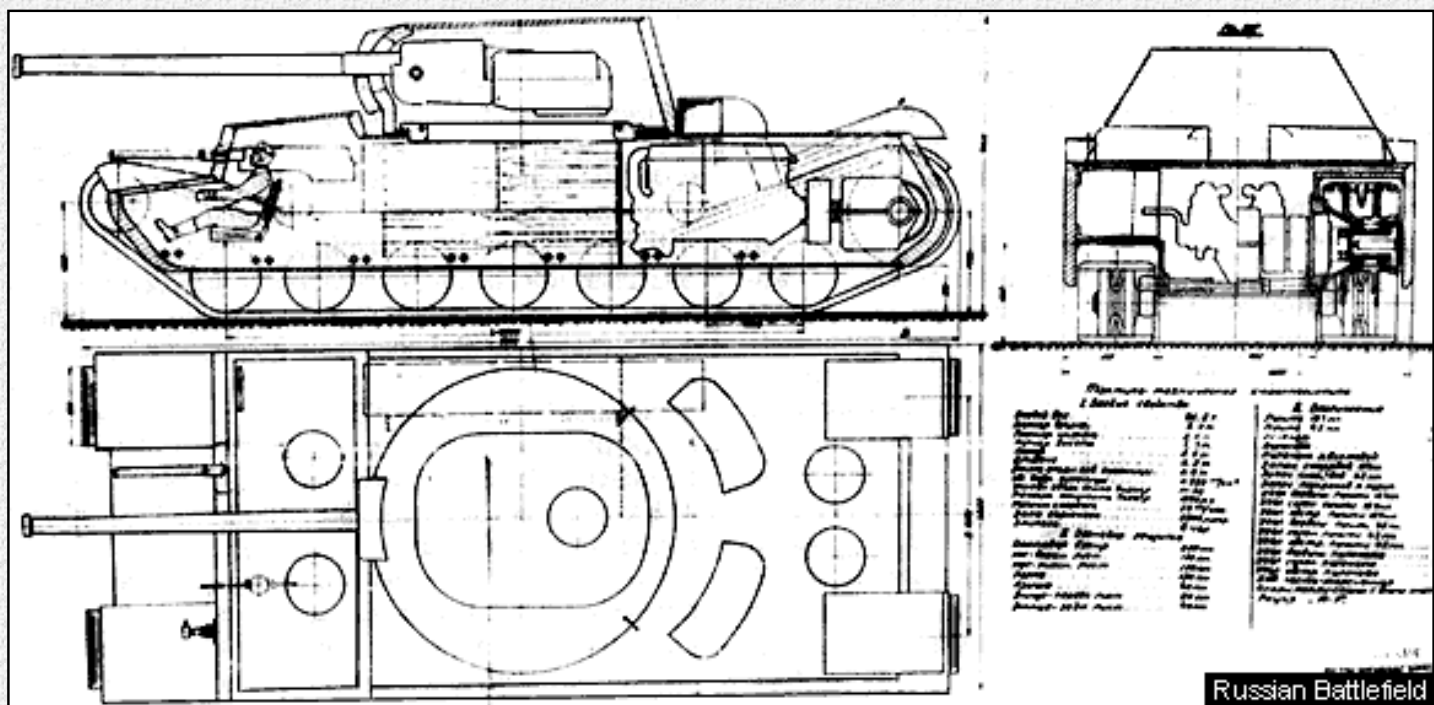
Two designers, P. Mikhailov and G. Turchaninov, in their designs recommended the mounting of the 45 mm Gun casemate fashion, having cut an embrasure for it in the frontal armor plate of the tank's hull, and they placed the 107 mm Cannon in a standard tank turret on the vehicle's hull.



KV-4 tank design of engineer K. Buganov. Photocopy of drawing.

Only engineer N. Tseits rejected the mounting of a second gun. He suggested the mounting of the 107 mm Cannon in a standard tank turret, laying it out in circular form so that the entire basic load of 120 fixed rounds were stowed along the walls of the cylindrical turret. This design stood out for its originality and in the future created fertile soil for employment of an auto-loading mechanism.

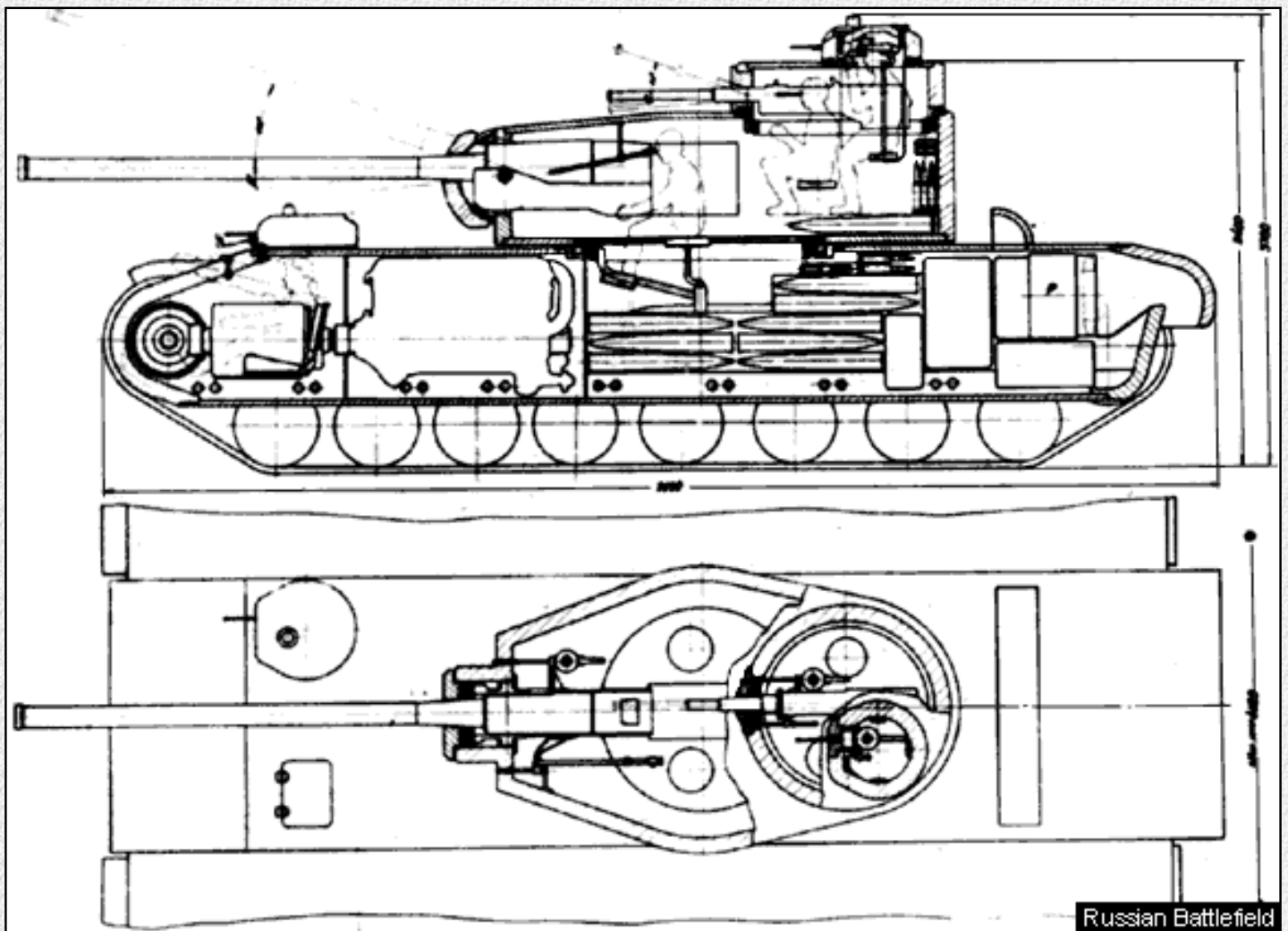
In a collective design submitted by three authors (P. Tarapatin, K. Kuzmin, and V. Tarotko), the 107 mm Cannon was positioned in the turret with a limited angle of rotation (130°). The designers V. Pavlov and D. Grigorev reached the same decision, but for the 45mm gun and not the 107 mm Cannon. Outside of the design parameters, some designers recommended the mounting of a flamethrower on the tank.



KV-4 tank design of engineer P. Mikhailov. Photocopy of drawing.

There were also some original suggestions for the armor of the KV-4 tank. For example, K. Bуганов and F. Marishkin selected a means of armor plating the tank turret in a form so that its ring was deep in the hull, which excluded jamming with the strike of projectiles and shrapnel, as happened during the tests of the KV-1 tank at Kubinka.

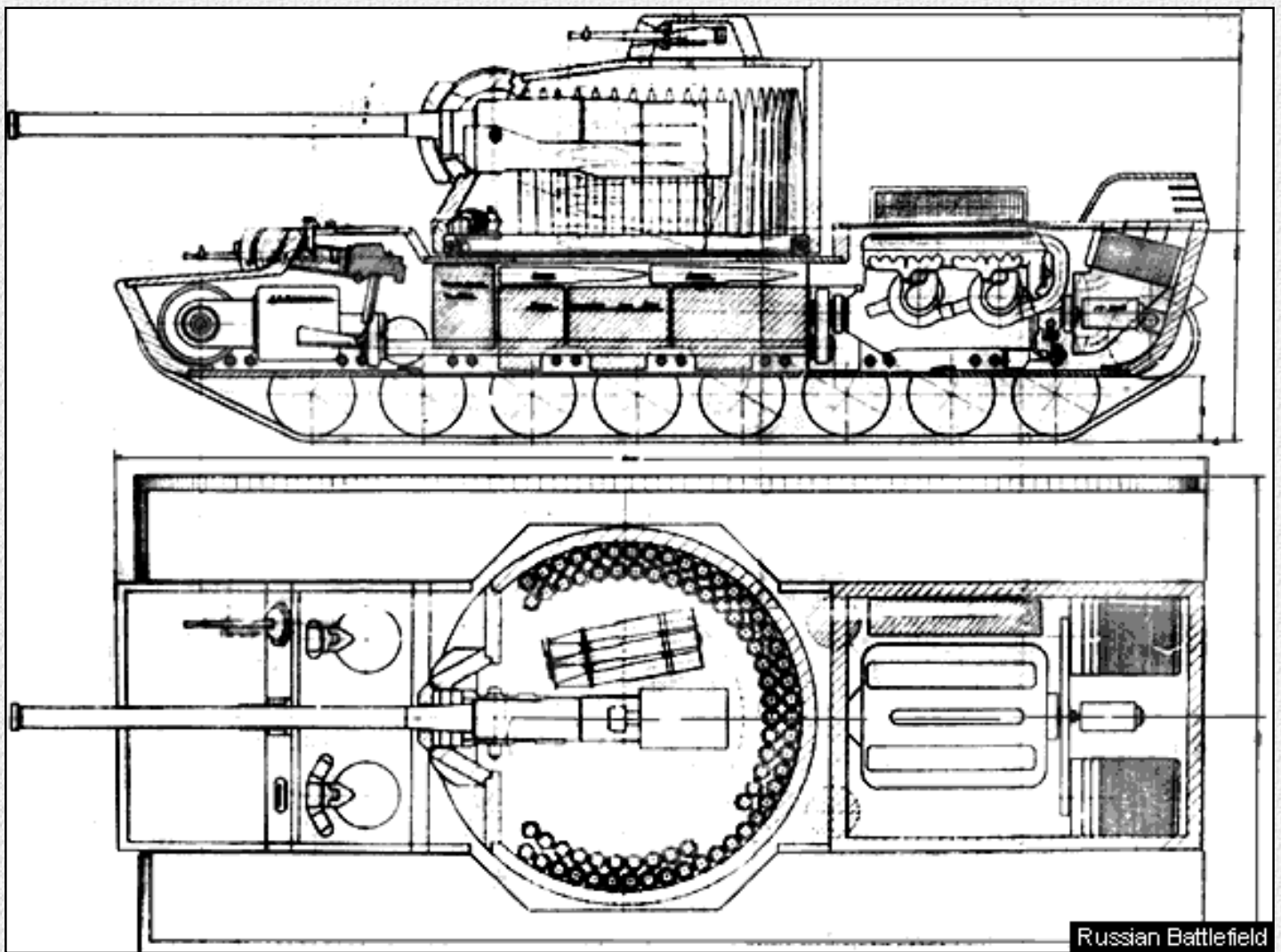
G. Kruchenykh and N. Strukov recommended a tank turret that was rhomboid-shaped with rounded angles, and engineer S. Fedorenko designed a turret with a non-traditional curved form with the mounting of two DT machine-guns and a 45 mm Gun on an original turret mounting, which permitted a rifleman to conduct fire without exposing himself from the hatch.



KV-4 tank design of engineer G. Kruchenykh. Photocopy of drawing.

In their designs these workers frequently resorted to other methods that had not been encountered earlier in tank design. For example, engineer P. Mikhailov developed an original tracked loop for their vehicle.

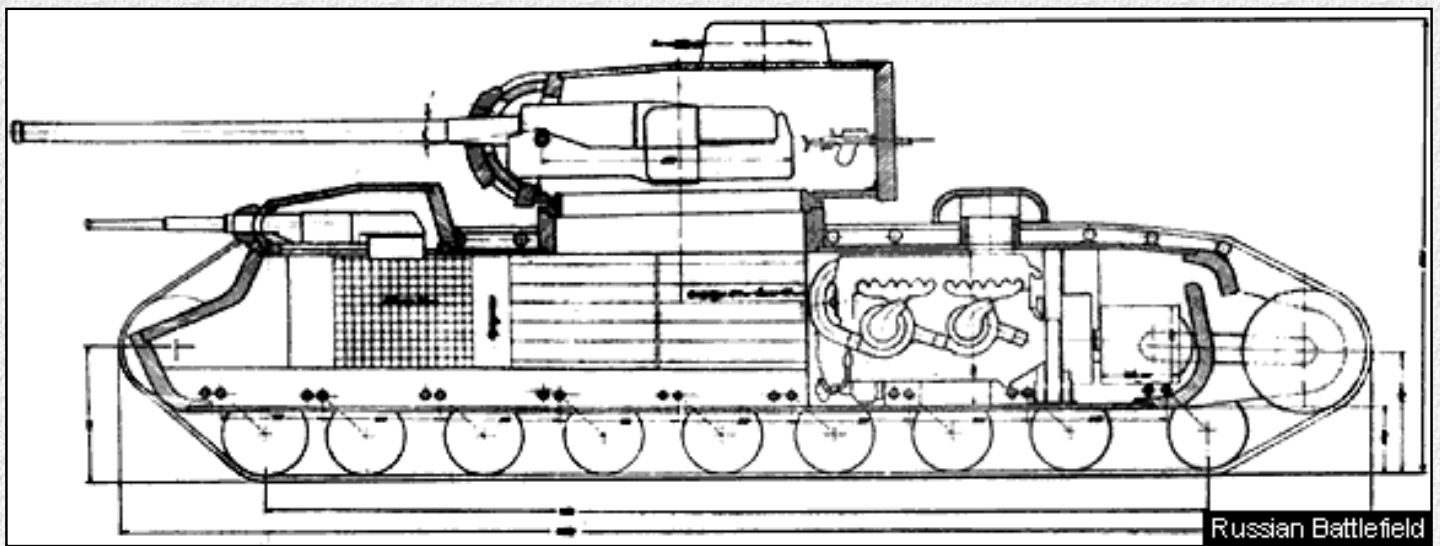
Five designers placed the engine and transmission in the front portion of the hull, which was an unusual decision for heavy tanks. Engineer N. Tseits suggested the placement of the engine in the stern and the transmission in the bow. L. Pereverzev recommended the pair of drive sprockets in the stern of the vehicle be removed from the hull and fastened to mounts, which gave some economy in the armor protection of the vehicle as a whole but at the same time made this most important component of the vehicle particularly vulnerable.



KV-4 tank design of engineer M. Tseits. Photocopy of drawing.

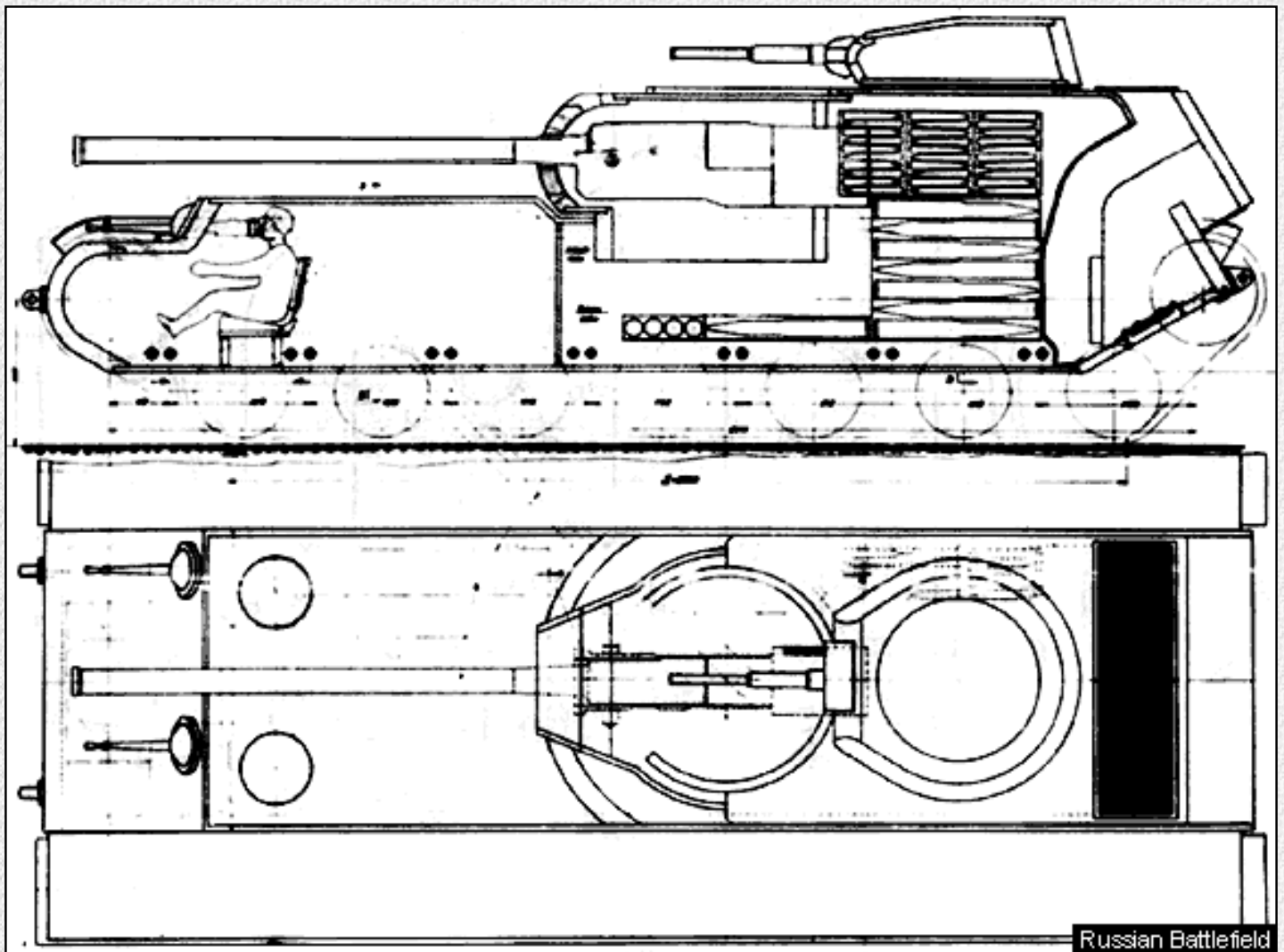
An analysis of the preserved drawings (about 20 variants of the KV-4 tank design have reached us) attests that many of the designs contain valuable from the design point of view decisions and fully deserve patenting at the inventor level. Work on the KV-4 project was conducted in the troubling prewar days and therefore authorship of the most interesting suggestions remains unconfirmed.

The artillerymen completed their task for the KV-3 tank first. It is a fact that the design bureau of Plant #92, under the supervision of V. Grabin, had worked out the design of the F-42 107 mm Tank Cannon in the fall of 1940, created on the base of the F-39 95 mm Tank Cannon. (This cannon had undergone successful testing in the T-28 tank turret in the summer of 1940). By the beginning of 1941, in accordance with a decision of the **NKO**, the 107 mm Cannon was prepared and successfully underwent factory testing on a field casemate. In March 1941 it was tested in the turret of a [KV-2 tank](#). By the middle of June 1941 the ZIS-6 Cannon underwent factory testing, after which it was sent to the Artillery Scientific Test Range at Leningrad.



KV-4 tank design of engineer L. Pereverzev. Photocopy of drawing.

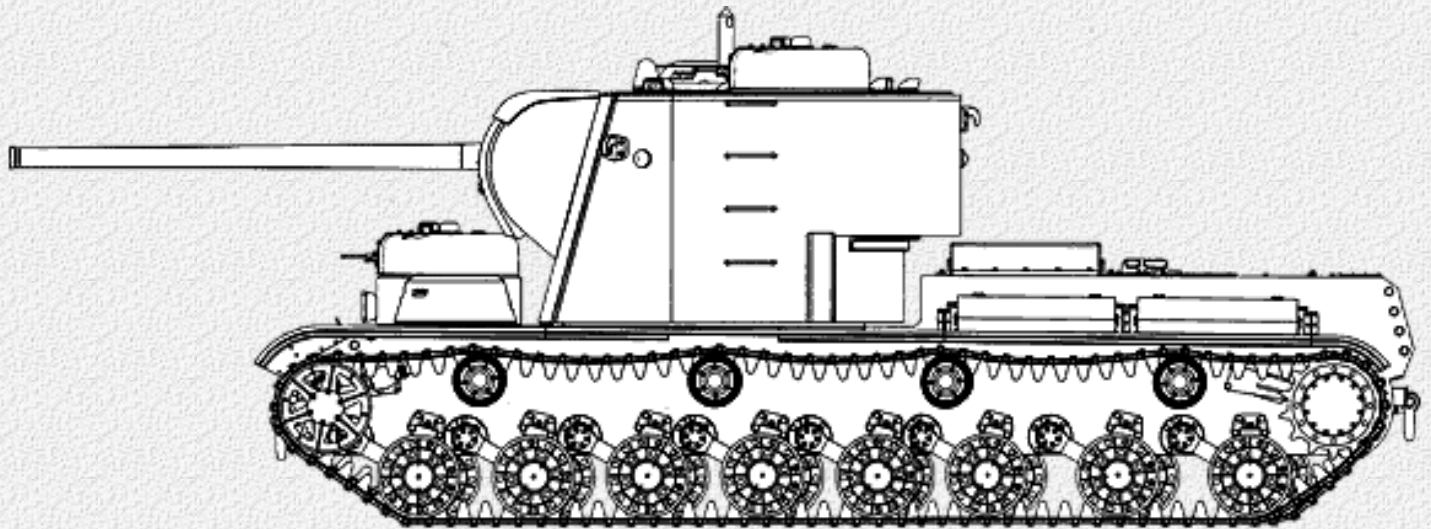
An interesting fact: in his memoirs "Oruzhie Pobedy" ("Weapons of Victory"), V. Grabin writes about 600 completed ZIS-6 cannons, which because of a lack of needed tanks went to the blast furnace in the fall of 1941. However, the chief designer of Plant #92 clearly dissembles: in calculating the work of his plant for 1941, by the way, signed by V. Grabin, it was said that *"five serially-produced ZIS-6 cannons were manufactured in July-August 1941, after which their production was halted because the heavy tanks were not ready."*



KV-4 tank design of engineers K. Kuzmin, P. Tarapatin, and V. Tarotko. Photocopy of drawing.

KV-5 Heavy Breakthrough Tank

Work was begun on the KV-5 tank ("Object 225") in June 1941. The talented designer N. Tseits, one of the oldest workers of SKB-2, was named the senior engineer for this vehicle. Also in his group were K. Kuzmin (hull), L. Sychev (turret and gun mount), and N. Fedorchuk (running gear components). The experience gained in the development of the KV-4 design was weighed during the design of the KV-5. The result was a powerful tank of relatively unusual appearance. The hull of the KV-5 had a height of 9.2 metres. Therefore the driver-mechanic and radio operator-machine gunner received special cupolas that permitted them an adequate sector of view. The rhomboid-shaped turret was of relatively large size. Housed in it were the tank commander, who had a commander's cupola, gunner, and loader. The solid diameter of the ring was 1840 mm and the large internal space of the turret afforded all members of the crew normal working conditions. The tank was heavily armored-150-180 mm.

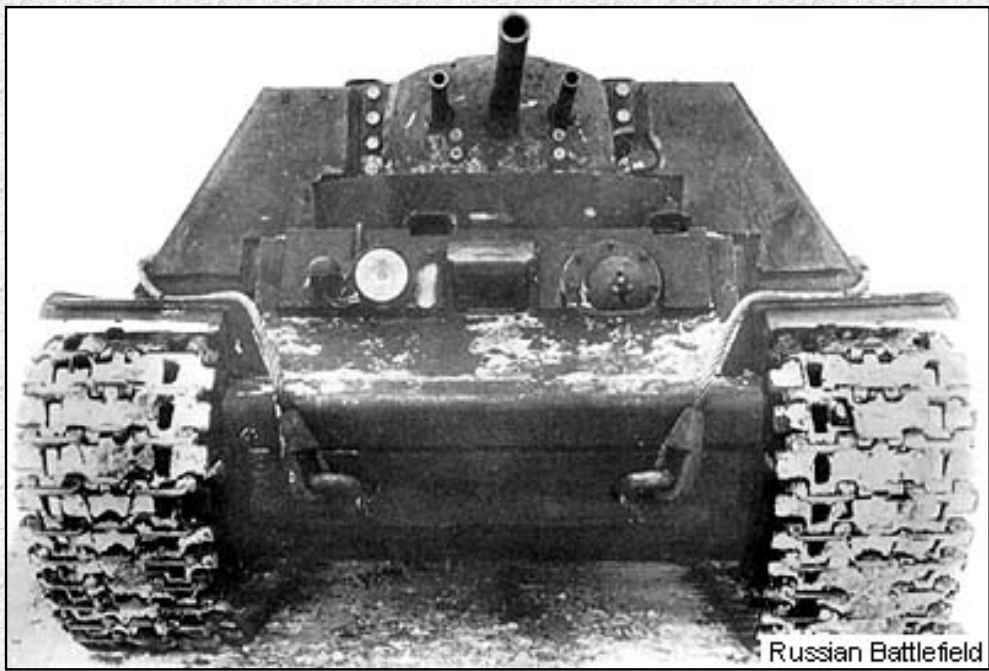


KV-5 heavy tank design. (V.Malginov)

With the beginning of the war, a whole series of collectives entered the project. Thus, the notion of a forged turret was abandoned and replaced by a welded turret design. In view of the absence of a 1200 h.p. diesel engine (it was still in development), the KV-5 was redesigned for the installation of two parallel-mounted conventional V-2 engines.

By August 1941 the KV-5 design was practically fully completed, and the production of a number of the tank's components and aggregates was begun. But because of the difficult situation at the front around Leningrad, all experimental work at the Kirov Plant was halted and all efforts were dedicated to increasing the output of production KV tanks. The latest date found in the preserved drawings of the KV-5 is 15 August 1941, when the battle was being fought around Luga and Krasnogvardeysk.

KV-7 Heavy Turretless Tank (Variant I)



KV-7-I turretless heavy tank. (*Janusz Magnuski*)

Note! In Janusz Magnuski's journal "Ciezki Czolg KW" this tank has been mistakenly given the name KV-6.

increase the firepower and rate of fire of the combat vehicle. The chief designer of "Object 227" was G. N. Moskvina and designers L. I. Gorlitskiy and N. V. Kurin from Uralmash were involved in the armament. L. E. Sychev exercised overall supervision.

Work was begun in mid-November 1941 and by 29 December this same tank, under the designation KV-7, was sent together with a KV-8 and a second variant KV-7 to Moscow for joint testing and display to I. V. Stalin. As a result of the tests, the tank was not recommended to accept for service.

The KV-7 was armed with one 76 mm Tank Cannon ZiS-5, with two coaxially mounted 45mm Tank Guns Model 1938 mounted in an armored gun platform. The guns could fire singly or in salvo. The vertical lay was from -5° to $+15^{\circ}$ and the horizontal lay $\pm 7.5^{\circ}$. Ammunition for the 76 mm gun was set at 93 rounds, and 200 rounds for the two 45 mm guns. In addition, the tank was armed with three 7.62 mm DT machine-guns: one hull-mounted facing forward, one facing rearward in the combat compartment, and one in a cupola on the combat compartment hatch. The combat weight of "Object 227" was 45 tons and it had a crew of 6.

KV-7 Heavy Turretless Tank (Variant II)

By the end of 1941, when the production of KV tanks had been shifted to the Urals, **SKB-2** received the tasking to develop an improved KV tank for the purpose of mounting a more powerful gun and improving its mobility characteristics. By 1942 several experimental variants of the KV had been suggested. One of the first was the design of an artillery mounting, "Object 227," with a non-rotating combat compartment- a gun platform formed from 100 mm armor plates. Because at that time there were no more powerful mass produced guns, the decision was made to mount the 76 mm Tank Gun and, in that manner,

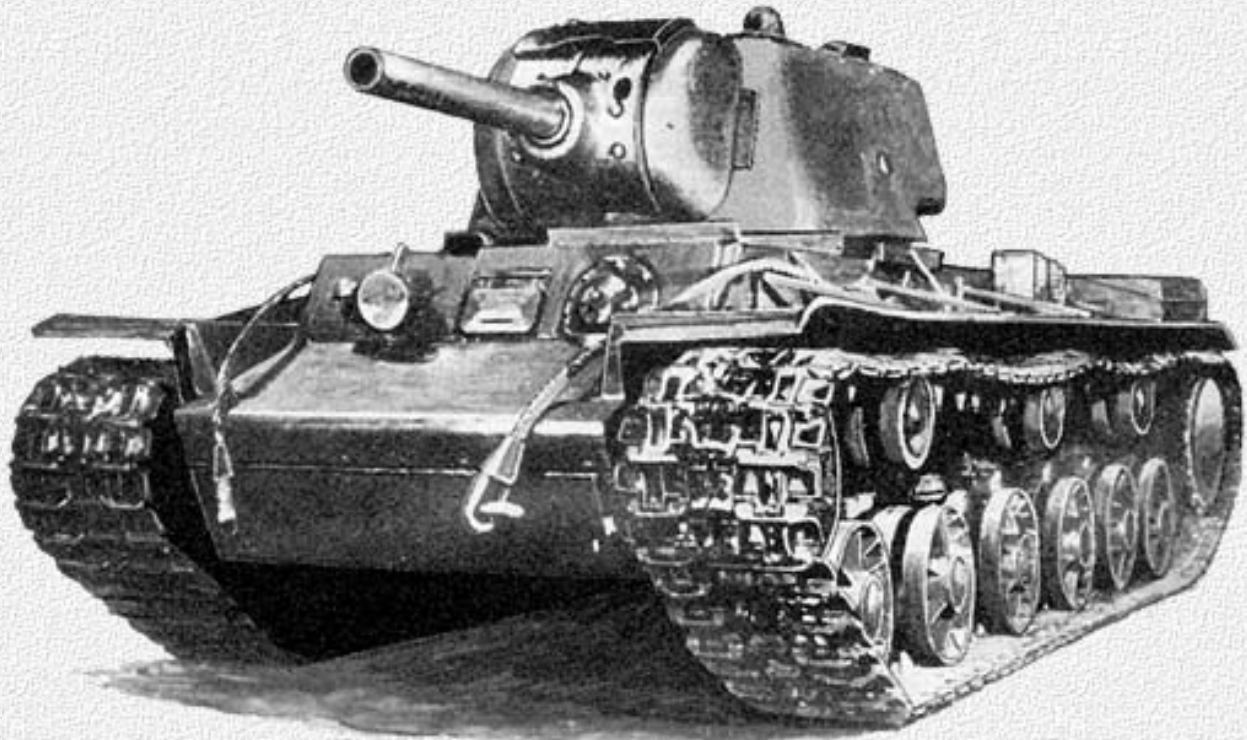


KV-7-II tank. *(Janusz Magnuski)*

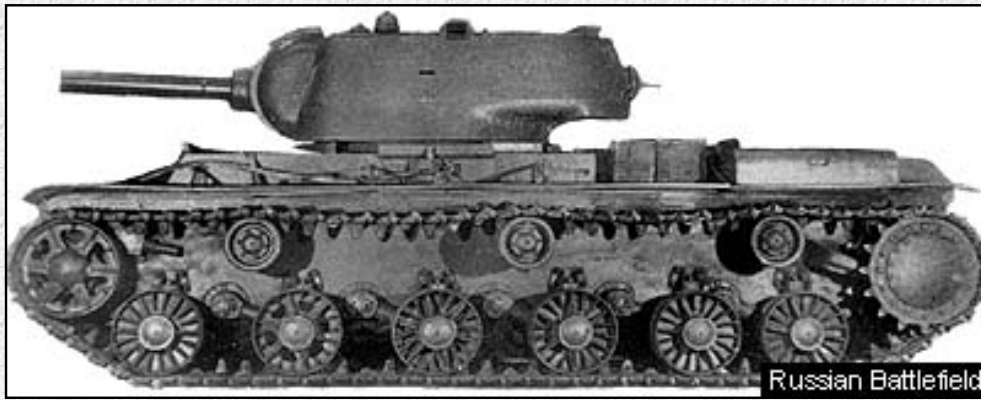
A second variant of the turretless KV-7 was being worked on practically parallel with the first variant KV-7. It also mounted multiple guns: its armament consisted of two coaxially mounted ZiS-5 76 mm Tank Cannons. In addition, the tank was armed with two 7.62 mm DT machine-guns: frontal and rear-facing. The ammunition supply for both main guns was 150 rounds. As has already been stated, at the end of December

1941 the vehicle, under the designation KV-7, was sent to Moscow for testing, which was conducted in the presence of K. I. Voroshilov, chief of **GABTU** I. Fedorenko, and Chief of **GAU** N. N. Voronov. As in the case of the first variant, this tank was recognized as unsuitable (preference was given to the [KV-8 flamethrower tank](#)). J. Stalin, to whom a copy of the test results was sent, responded, "Who needs three cannons? It would be better to mount one, but good one," which put a halt to the idea of a multiple-gunned KV.

KV-9 Heavy Assault Tank



In the fall of 1941, after the misfortune with the development of the KV-3 and KV -5, the question arose of the creation of an artillery (assault) tank. The KV-9 heavy tank ("Object 229") was the



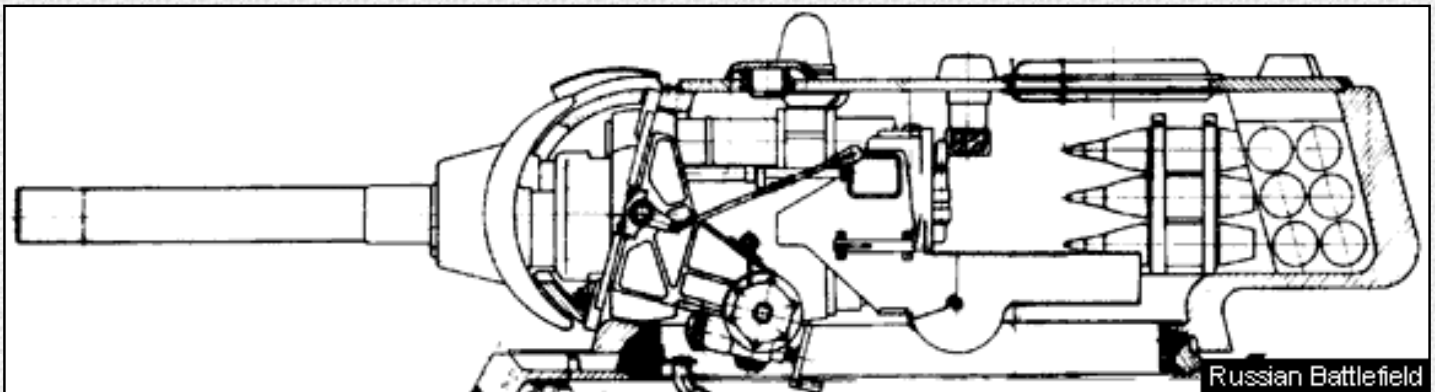
KV-9 experimental heavy tank. (M.Kolomiets)

next effort to rearm a [mass production KV-1](#) with a more powerful gun system, in this case the U-11 122 mm Tank Howitzer, designed in December 1941 under the guidance of engineers V. Sidorenko and N. Usenko. Work on this vehicle was begun in November 1941 at **ChTZ** (with the participation of Uralmash engineers), and continued until

April 1942. "Object 229" was recommended to accept for service under the designation KV-9. In addition to the prototype, the plant was to produce a lot of 10 tanks, but in fact managed to produce only one additional KV-9. Plant No. 9, which was responsible for production of the U-11 howitzer, produced 10 of them.

The basic idea during the creation of the KV-9 was an attempt to create a multi-purpose heavy tank capable of successful combat not only with enemy fortifications, but also with his tanks. The weight of the tank was 47 tons and it had a crew of four men: two in the turret and two in the hull.

The tank had the easily replaced cast turret from the KV-1. For protection of the tank against antitank guns, its frontal armor had an enormous for the time thickness of 135 mm. The armor thickness on the turret roof was 40 mm. The tank was equipped with a TMFD telescopic sight. The U-11 cannon had semi-fixed ammunition from the M-30 Howitzer, its vertical elevation angle was $-4^{\circ} +19,5^{\circ}$. The tank's basic load consisted of 48 rounds for the main gun and 2,646 cartridges for the three 7.62mm DT machine-guns.



Mounting of the U-11 Howitzer in the KV-9 turret. Photocopy from plant drawing. (M.Svirin)

Combat Employment

In many publications it is possible to find references to the fact that these vehicles (all or some) were moved to Chelyabinsk, and that the turrets and other parts of the KV-3 tanks were also evacuated there. Unfortunately, this information is not supported by archival documents. For example, in reports of the representatives of the military office at the Kirov Plant, which scrupulously recorded all information regarding the production of KV tanks, it is clearly stated that

the T-150, KV-220-1 (as the KV-220 tank was designated in the military office documents) and KV-220-2 (as the incomplete KV-3 tank was designated in the military office documents) were not evacuated anywhere, and the entire time remained at the Kirov Plant. In early October 1941, when the production of KV tanks in Leningrad was practically halted, they decided to turn the experimental tanks over to the troops. All of them underwent necessary repair, during which serial KV-1 turrets were installed on the KV-3 and KV-220 (the KV-3 basically had no turret and the armament on the KV-220 had been disabled at the beginning of the summer).



Film still picture. KV-220 with KV-1 turret at the Kirov Plant, Leningrad, fall 1941. (M.Kolomiets)

In accordance with reports of military representatives, "the experimental T-150 tank was issued to 123rd Tank Brigade on 11 October 1941; the experimental KV-220-1 tank (with factory No. M-220-1) was issued to 124th Tank Brigade on 5 October 1941, and the experimental KV-220-2 tank (with factory No. M-220-2) was issued to 124th Tank Brigade on 16 October 1941. All tanks were armed with the F-32 76 mm main gun."

Reports about the subsequent fate of these vehicles are exceedingly sparse. Only one recollection has been located, that of D. Osadchiy, commander of a tank company in 124th Tank Brigade (cited here verbatim):

"In the fall of 1941 our brigade received several KV tanks as replacements, one of which was named "Za Rodinu" [For the Motherland]. It was produced as a single example at the Kirov Plant. It had the same capabilities as the KV tank, but it had heavier armor protection, a weight of more than 100 tons, and more a powerful engine with turbocharger. During movement in the upper gears the engine whistled and this whistling was very much like the whistle of a diving "Junkers". The first time after receipt of this tank during its movement in the brigade someone even gave the "air alert" signal. The tank came to my company and initially we wanted to make it my command tank. But alter it became the command tank of my deputy, experienced tanker Lieutenant Yakhonin. The tank was considered practically indestructible for enemy artillery and was intended for assault on fortified positions.

In December 1941 (I don't remember the exact date), our brigade received the mission to break through the Germans' defense in the sector Ust-Tosno railroad bridge, force the Tosna River, and in coordination with units of 43d Rifle Brigade develop the attack toward Mga. The 2d Tank Battalion under the command of Major Pankin, a tank platoon from 1st Battalion, and the tank "Za Rodinu" from my company attacked in the first echelon. In this battle the tank received the mission to capture the railroad bridge across the Tosna River and hold the bridgehead for the arrival of the main body. The battle unfolded on open terrain. The frozen upper layer of peat barely supported the tank. When it approached right up to the bridge, it was greeted with the fire

of German heavy guns and radio communications with the tank were lost. At this time I was at the battalion command post. When communications were broken with the tank "Za Rodinu", I attempted to reach the place of the engagement along the railroad embankment. When I managed to crawl to the tank, I saw that the turret had been blown off the tank and the crew was all dead."

Thus, the KV-220 or KV-3, which is not precisely known, was destroyed. Information regarding the fate of other KV tanks has not been found.

Table 1. Specification of Some Projects of KV-4 Heavy Tank

Parameter	KV-4 by Kreslavsky	KV-4 by Kuzmin, Tarapatin, Tarotko	KV-4 by Pereverzev	KV-4 by Mikhailov	KV-4 by Kruchenykh	KV-4 by Tseits
I. Main characteristics						
Combat weight, kg	92,600	88,000	100,000	865,00	107,700	90,000
Max length, m	9	9.26	6.5	9	9.13	8.35
Max width, m	4	3.79	3.8	3.6	4.03	4.03
Max height, m	3.225	3.175	3.32	3	3.78	3.62
Track, m	3.15	3.04	3	2.5	3.1	3.18
Clearance, m	0.6	0.5	0.52	0.5	0.55	0.55
Length of bearing area, m	6	6.66	?	?	6.09	6.05
Ground pressure kg/cm ²	0.908	0.8	?	0.896	1.04	0.88
Engine	Diesel M-40					
Max. power, h.p.	1200					
Max speed, km/h	45	36	39	50	35	45
Range, km	180-230	250	300	2800 litres	320	180
Crew	6	6	6	5	9	7
II. Armor						

Side armor, mm	hull- 125, turret- 140	125	125	150	hull- 130, turret- 140	125
Upper frontal plate, mm	80	125	100	130	130	130
Lower frontal plate, mm	130	125	125	180	130	130
Rear, mm	130	100 and 125	125	130	100 and 130	125
Êðûøà, ì	50	40	50	40	50	60
First bottom plate	40	40	50	50	50	50
Second bottom plare, mm	40	40	40	40	50	50
III. Armament						
Main Gun #1	one 106.7 mm ZIS-6					
Main Gun #2	one 45 mm 20-K					n/a
Machine-guns	3		4x7.62 mm DT	3x7.62 mm DT	4x7.62 mm DT	2x7.62 mm DS
Ammo for the gun #1	103	20	100	85	105	108
Ammo for the gun #2	140	160	103	150	300	n/a
Ammo for machine-guns	6000	4200	4500	45 magazines	10000	10000
Elevation angle for the gun #1	+15° -7°	+? -5°	+20° -7°	+20° -5°	+20° -12°	+20° -5°
Elevation angle for the gun #2	+15° -7°	+80° -5°	+25° -7°	+20° -5°	+20 ° -12°	n/a
Traverse for the gun #1	360°	60°	360°	360°	360°	360°

Traverse for the gun # 2	360°	360°	270°	45°	360°	n/a
Additional armament	n/a		flamethrower	flamethrower	n/a	flamethrower
IV. Other propeties						
Suspension	torsion bar					
Road wheels	steel; with internal shock-absorber					
Radio	10-R					

REFERENCES:

[Blueprint of the KV-220;](#)

[Blueprint of the KV-5;](#)

[Specification of Soviet tanks](#)

[Specifications of Soviet tank guns](#)

Translators:

From Polish: [Krzysztof Pawlowski](#)

From Russian: [James F. Gebhardt](#)

Sources:

"Tankomaster" #6, 2000;

Janusz Magnuski "Ciezki Czolg KW", 1997;

Pavlov, I. V., Pavlov, M. V., "Sovetskie Tanki i SAU 1939-1945", Moscow 1996;

M.Svirin "Artilleriskoye Vooruzhenie Sovetskikh Tankov 1940-1945" ÀArmada-Vertikal, #4, 1999;

V.Gagin "Tyazhelyi Tank Propyva Klim Voroshilov", Polygraph, 1996

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SMK Heavy Experimental Tank

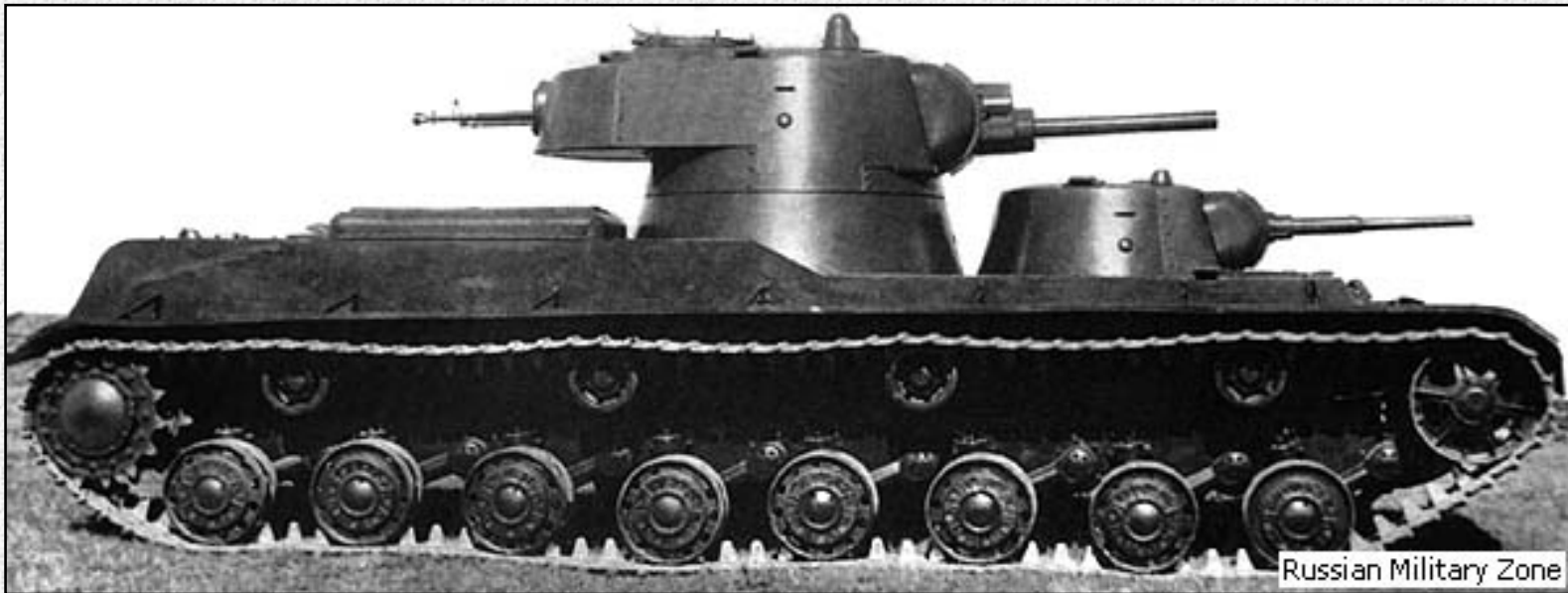
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In 1937 the Design Bureau of the KhPZ received the tasking to design a new heavy breakthrough tank on the base of the T-35. A requirements document of the ABTU, affirmed on 5 November 1937, suggested that a three-turreted vehicle be created, with a weight of 50-60 tons, armor thickness of 45-75mm, and armaments consisting of a single 76mm and two 45mm guns, and two DK and six DT machine-guns.

It was planned to use the transmission and drive train of the T-35 in the new tank. However, the Design Bureau KhPZ, which in normal circumstances lacked sufficient resources to carry out such complex work, had been subjected to mild repressions among its engineering staff working on the project. Therefore, despite countless demands of the ABTU, by the beginning of 1938 the KhPZ designers had managed only to complete preliminary designs of the six variants of the new tank, which differed only in the arrangement of the armaments. Therefore, in April 1938, in order to accelerate the design of the new heavy breakthrough tank, the ABTU brought into the effort the LKZ, with its powerful production base and the experience of serial production of the T-28, and also Kirov Factory #85, the cadre of which had experience in their own right in the development of new types of combat vehicles. The former plant (LKZ) designed the SMK (Sergey

Mironovich Kirov) tank, under the leadership of engineer A. S. Ermolaev. Factory #85 designed "Project 100," which subsequently received the designation T-100, led by engineer E. Sh. Paley. Thus, contrary to some oral and written accounts, the SMK and T-100 tanks had different bases and were developed simultaneously.



Lacking agreements for the preparation of these new vehicles, the plants carried out preliminary design work until August 1938. Full work began only after promulgation of Resolution #198 of the Defense Committee of the SNK of the USSR on 7 August 1938, which established strict deadlines for preparation of the new tank models. The SMK was to be completed by 1 May 1939 and the T-100 by 1

June 1939. Just two months later, 10-11 October 1938, a commission chaired by the deputy chief of the ABTU, Military Engineer 1st Rank Korobkov, examined blueprints and full-scale wooden mockups of the SMK and T-100 tanks. Despite a number of deviations from the published tactical and technical requirements [TTR], in particular the substitution of torsion bars in place of the T-35's coil spring suspension, and on the T-100 idler wheels with leaf springs, the prototype commission gave approval for completion of test models of the tanks in accordance with the blueprints and mockups that had been presented.

The designs of the new heavy tanks were reviewed in a joint session of the Politburo of the TsK VKP(b) and Defense Committee on 9 December 1938. On the instructions of J. V. Stalin, the number of turrets on both tanks was reduced to two in order to reduce the weight of the vehicles. The production of the tanks in steel was begun in January 1938.

The first test runs of the SMK outside the production facility were conducted on 30 April 1939, and of the T-100 on 1 July of that year. After factory running in, both vehicles were handed over for range testing, which began on 31 July. The SMK and T-100 participated in a government demonstration of serially produced and experimental tanks conducted at Kubinka in the Moscow area on 20 September, 1939. Attending this showing were K. E. Voroshilov, A. A. Zhdanov, N. A. Voznesenskiy, A. F. Mikoyan, D. G. Pavlov, I. A. Likhachev, V. A. Malyshev, and others. By the end of 1939 the SMK had been run some 1700 km and the T-100 more than 1000 km. With the beginning of the Soviet-Finnish War, both tanks were withdrawn from range testing and sent to the front to undergo testing in a combat environment.

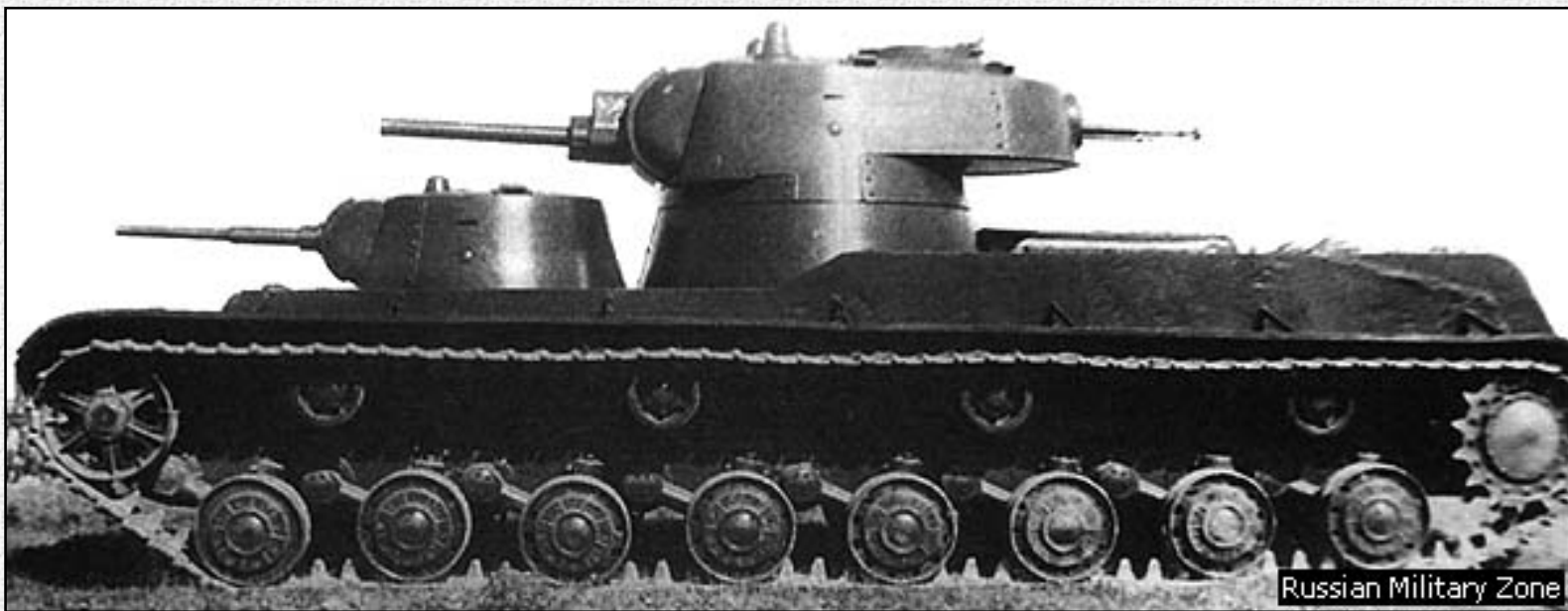
These tests were conducted through the efforts of factory drivers, for which special permission was received from Moscow. The workers selected for the tests underwent special abbreviated training in driving the vehicles, firing the cannons and machine guns, and as well other skills required for combat. The commander of the SMK crew was Senior Lieutenant Petin, the deputy commander was Sergeant Mogilchenko, and the gunner-radio operator and gunner were Red Army soldiers. In addition, three workers from the Kirov Works were added to the crew of the SMK: mechanic-driver V. I. Ignatev, engine mechanic A. P. Kunitsyn, and transmission specialist A. G. Tokarev. The crew of the T-100 consisted of military personnel of the 20th Heavy Tank Brigade: commander Lieutenant M. P. Astakhov, gunners Artamonov and Kozlov, radio operator Smirnov, and workers from Factory #85, driver A. D. Plyukhin, back-up driver V. A. Drozhzhin, and engine mechanic V. I. Kaplanov.



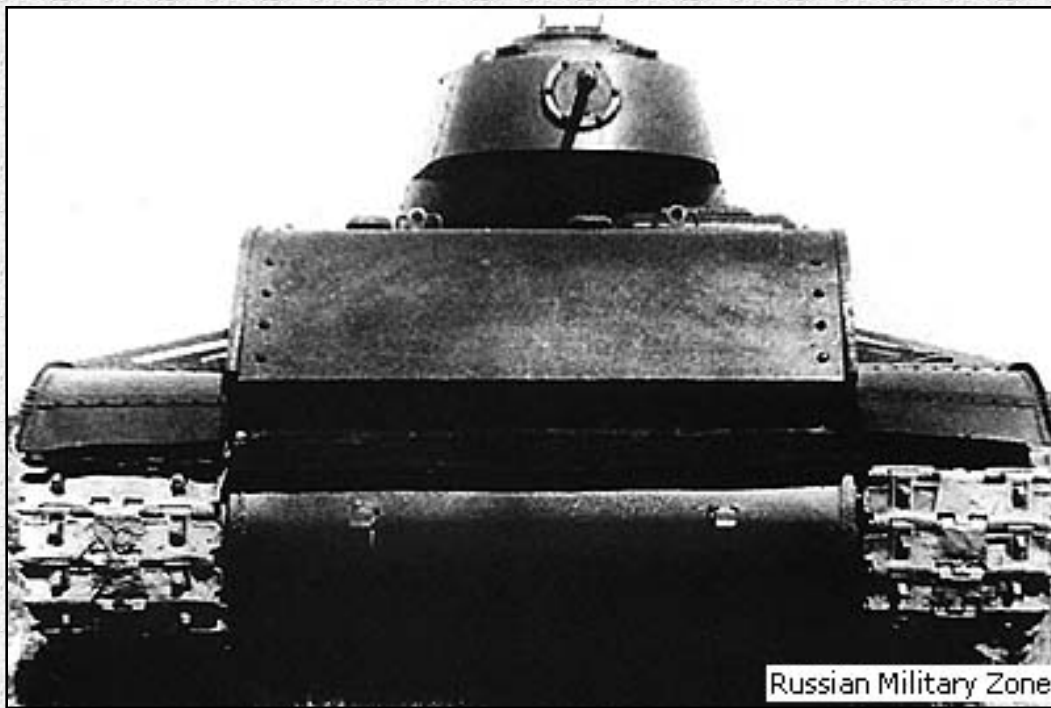
The SMK, T-100, and experimental KV tanks comprised a company of heavy tanks that was included in the 91st Tank Battalion of the 20th Heavy Tank Brigade. A Captain Kolotushkin was named commander of this company. The unit entered combat in the Khottinen area on December 17, 1939.

The history of the combat employment of the SMK and T-100 tanks has been described in sufficient detail in many Russian and western publications. The general tenor of these descriptions is consistent almost everywhere and can be summarized as follows.

Moving at the head of a tank column, the SMK drove toward a pile of crates, under which were concealed high explosives. The detonation of these explosives damaged the idler wheel and track and the tank stopped. The T-100 and KV halted nearby, covering the damaged SMK. Taking advantage of this cover, the SMK crew worked for several hours to repair their tank. However, they were unsuccessful and had to abandon the SMK in the neutral zone. From book to book what follows this description is a detective story about how brave Finnish scouts crept up to the tank and covertly removed the driver's hatch cover. This hatch cover, made from conventional (not hardened) steel because the constructors had not succeeded in sending it in for treatment, later fell into the hands of German engineers. These engineers decided that the SMK was made entirely from cast armor. And the decisions that followed from this conclusion played a large role in the Soviet victory over German fascist forces.



However, examinations of archival documents indicate that all that is recorded above does not correspond to reality. The first time the heavy tank company went into combat was on 17 December 1939, in the area of the Finns' Khotinen fortified region. After a failed first attack, the effort



was repeated twice, unsuccessfully, on the next day. During the last attack, the barrel of the main gun of the KV was shot up. The vehicle was sent in for repair.

On December 19, the SMK and the T-100 were assigned the mission to support our units that were penetrating into the depths of Finnish fortifications in the Khottinen area. Both vehicles moved forward,

accompanied by five T-28 tanks. These tanks were already deep into the enemy's defenses when a powerful explosion occurred under the leading SMK. The T-100 and one T-28 halted near the damaged tank and the remaining four vehicles, seeking cover, moved forward. The SMK crew attempted to recover their tank by rejoining its damaged tracks, but they were unable to restart the engine. Countless attempts to tow the damaged SMK with the T-100 did not bring success. Because of the icy conditions, the tracks of the T-100 could not get traction and the T-100 could not move the SMK. The tanks had fought in the depth of Finnish positions for approximately five hours. Sergeant Mogilchenko was seriously wounded and the driver Ignatev was lightly wounded. Having expended all of their ammunition, the crew of the SMK moved over to the T-100. The overloaded T-100 (with 15 crewmen!), accompanied by a T-28 tank, returned to the location of 20th Tank Brigade. The vehicles' crews were awarded orders and medals for this combat.

The loss of the experimental tank was cause for some distress for the ABTU chief, D. G. Pavlov, which is quite understandable. By his personal order, a company of 167th Motorized Rifle Battalion and 37th Sapper Company, reinforced with two guns and seven T-28 tanks, were dispatched to protect the secret combat vehicle. This detachment, commanded by a Captain Nikulenko, managed to penetrate some 100-150 metres into the Finnish obstacle belt, where heavy artillery and machine-gun fires met it. Having lost 47 men killed and wounded, the detachment withdrew to its start position without having accomplished the mission.

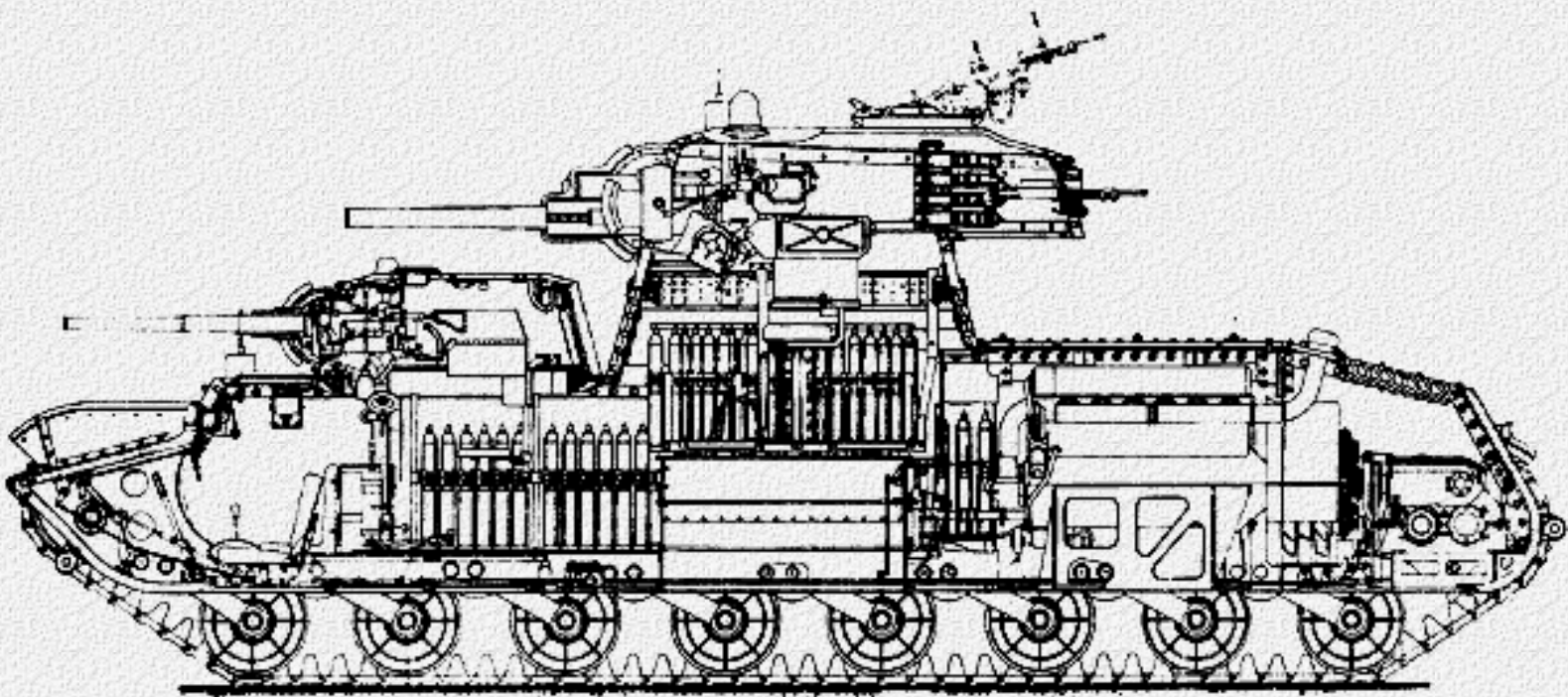
The damaged SMK remained in the depth of Finnish positions until the end of February, 1940. Our forces caught sight of it on 26 February, after breaking through the main belt of the Mannerheim line. In early March 1940, six T-28 tanks were used to tow the SMK to Perk-Yarvi railway station. Some disassembly was conducted there and the tank was moved by rail to the Kirov Factory. On instruction of the ABTU, the factory was to repair



the tank and send it to Kubinka for storage. But for a number of reasons the repair was not carried out. The SMK remained in outdoor storage at the factory until the 1950s, when it was cut up for the smelter.

Regarding the history of the stolen hatch cover, this is just another myth. The

hatch was made from hardened steel, as was the entire tank. Upon the liberation of the captured region the tank was inspected and the hatch was found to be present. Finnish scouts did not have to risk their lives to reach the SMK and clandestinely take something from it. The vehicle lay in the depth of Finnish positions and, if it had become necessary, they could have quietly disassembled the tank and hauled the pieces away. In fact, they did manage, with the assistance of captured Soviet tankers, to repair and tow away two T-28s, and for spare parts for these two intact vehicles to remove and haul away from many other tanks damaged in the same battle as the SMK not only optical instruments (sights), radios, and items of internal equipment but also turrets, engines, radiators, transmissions, and so on. Without doubt, as trophies the Finnish command was interested most of all in mass produced vehicles, which could be rebuilt and used, in lieu of some vehicle of an unknown type, standing alone some 50 metres from the Headquarters of Khotinen Fortified Region.



REFERENCES:

[Specification of Soviet tanks](#)

[Specifications of Soviet tank guns](#)

Translated by:

[James F. Gebhardt](#)

Sources:

"Tankomaster" #2, 1997;

I. Drogovoz "Zhelezniy Kulak RKKA", ID T-M, 1999;

I. Pavlov, M. Pavlov "Sovetskie Tanki i Sau 1939-1945", Moscow 1996.

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SU-100Y Self-Propelled Gun

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SU-100Y SP-Gun in Kubinka. (V.Potapov)

Note: All Russian terms and abbreviations marked as *red italic* are described in the [Glossary](#).



SU-100Y SP-Gun in Kubinka. Autumn 1940. (ASKM)

Heavy breakthrough tank T-100 became a base model used for development of several vehicles designed on the basis of experience gained during the war with Finland (1939-1940).

At the beginning of the Soviet-Finnish war the Red Army realized necessity of having dedicated engineering armoured vehicles.

Consequently, in the middle of December

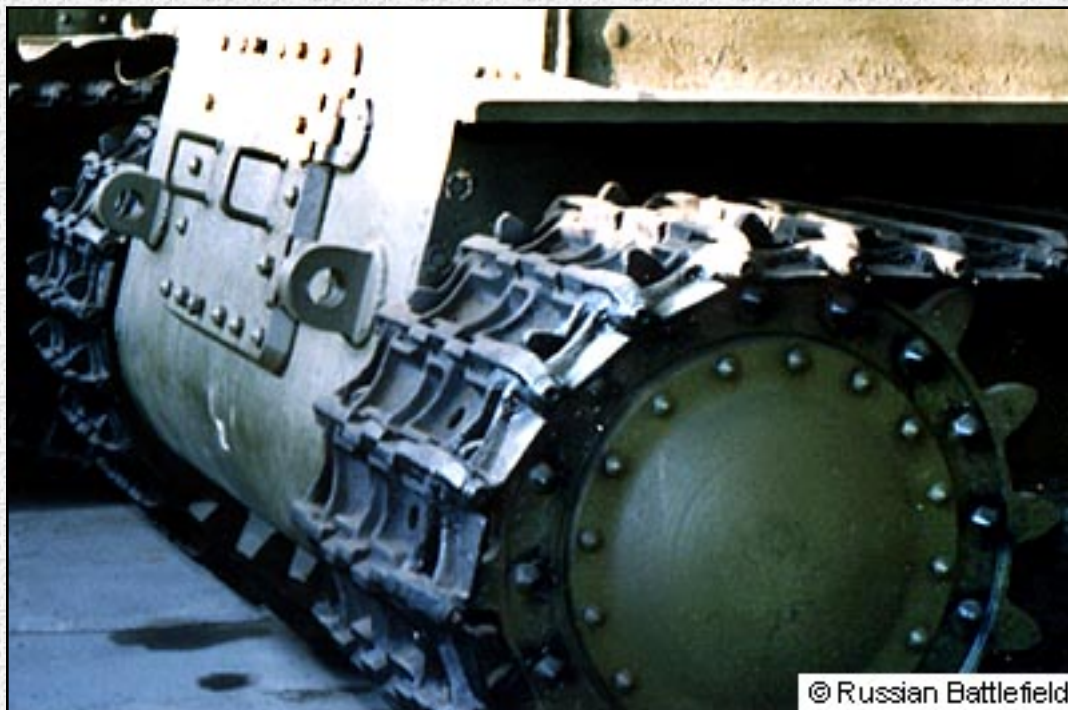
1939, War Council of the North-Western Front obliged the Factory #185 to develop and

manufacture an armoured engineering vehicle based on the T-100 Heavy Tank. The vehicle was to be used for laying bridges, transport of sappers and explosives, as well as evacuation of damaged tanks from battlefield. As design works were in progress the Head of **ABTU** Red Army, D. Pavlov, set the task that (cite) "152mm or similar high velocity cannon be fitted on the T-100 tank base" to destroy DOTs (concrete pillboxes) and other fortified structures. Accordingly the director of Factory #185, N. Barykov, requested the War Council of the North-Western Front to change the order to prepare an engineering AFV for the one to re-fit the tank with 100mm or 130mm naval gun. The request was accepted and by 8th of January 1940 drawings of the hull of T-100-X, as the new SP-Gun was designated, were forwarded to Izhorskyi Factory.



The rear hatch in the fighting compartments of the SU-100Y. (V.Potapov)

The difference between T-100 and T-100-X was that the T-100 had a rotating turret whilst the latter - a wedge-shaped fighting compartment with 130mm B-13 Naval Gun. The vehicle had torsion bar suspension that was prepared by Kirov Factory since it had already gained substantial experience in similar suspensions. During detailing works on the fighting compartment its shape was simplified to reduce manufacturing time. The revised design was designated SU-100Y (in the Soviet designation the "X, Y, Z" letters were latin - iks, igrek, zet), though in few documents it was called T-100-Y. The hull of SU-100Y was shipped from the Izhorskyi Factory on 24th February 1940, and on



The rear of the SU-100Y. (V.Potapov)

1st of March assembling works started. The self-propelled gun was first driven on 14th of March. By that time the Soviet-Finnish War ended and SU-100Y could not be tested under the combat conditions.

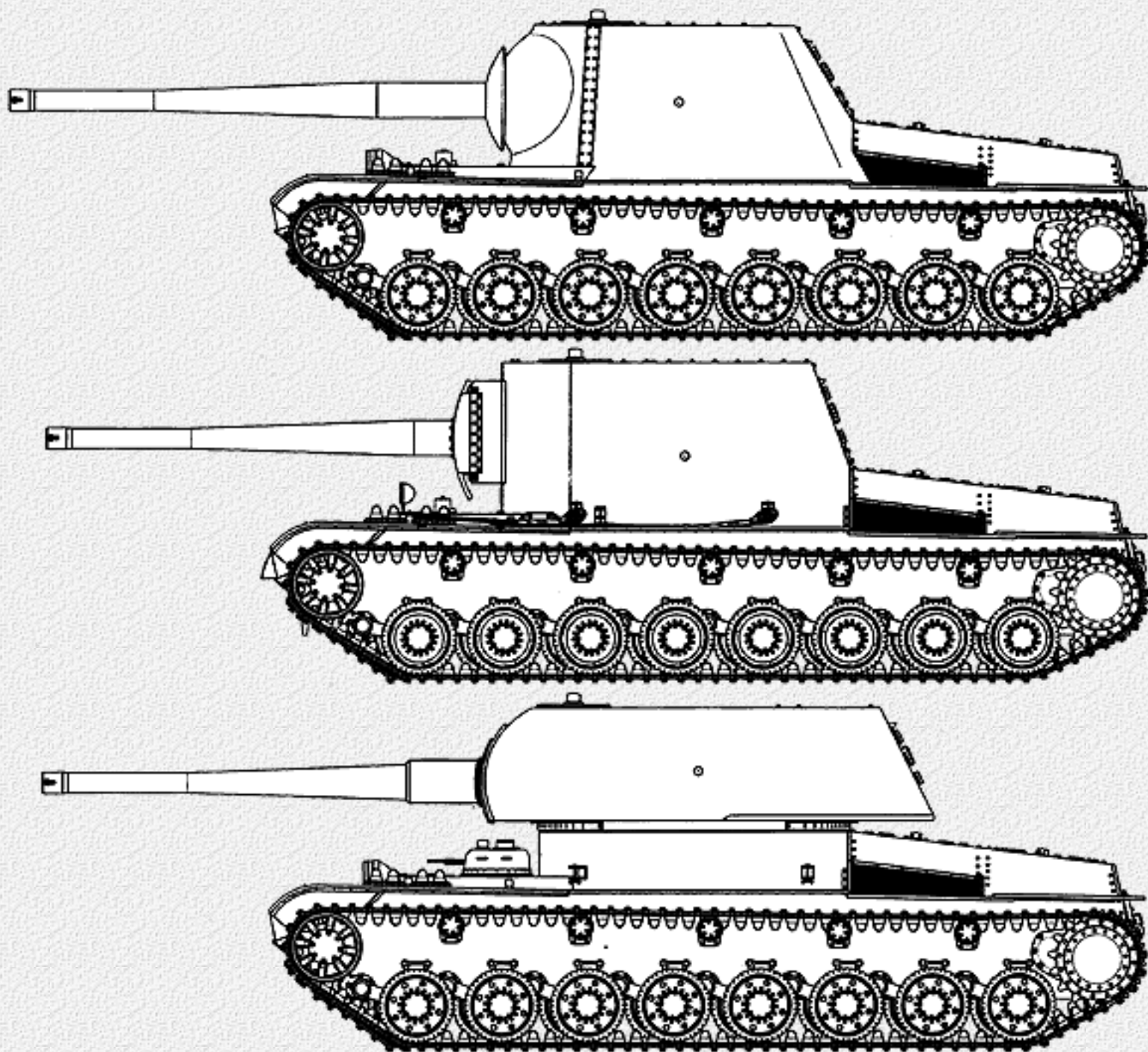
Earlier, while the war was still going on, attempts were made to modernise T-100 tank by installing heavier armament. In January 1940 a deputy of National Commisar of

Defence and 1st rank army commander G. Kulik, ordered (cite) *"to increase the T-100 firepower by installation of 152mm M-10 howitzer to be capable of destroying concrete structures dragon teeth in defence lines"*. A new turret with 152mm M-10 howitzer was completed in the middle of March 1940 to replace the original turret with 76mm L-11 gun. The new model was designated T-100-Z. Installation of the new turret was abandoned as [KV-1](#) and [KV-2](#) tanks were being brought into service. **ABTU** suspended all works on further modifications of T-100 tank.

In April 1940 construction bureau of Factory #185 led by Mr. Shufrin produced a design of heavy tank for seashore defence based on T-100 "Object 103". 130mm B-13 naval gun was fitted in the rotating turret and three 7.62mm DT machine-guns were installed. The design however stayed on the drawing board.

As the works on the T-100 were terminated, fate of SU-100Y was sealed. The SP-Gun was transferred to Kubinka in summer 1940. It was not evacuated at the beginning of war. In November 1941, during the most critical stage of the battle of Moscow SU-100Y, together with 152mm gun armed experimental SU-14 and SU-14-1 self-propelled guns, was pressed into service in an Independent Artillery Divizion for Special Duties (there is no mistake, Soviet "divizion" term is similar to battalion but applied for artillery units). Records of the combat employment of the SU-100Y have not been found.

Unlike its base model (T-100), SU-100Y has been preserved and currently is displayed in the Military Historic Museum of Tank Armament and Technology in Kubinka.



Armoured vehicles based on T-100 chassis: *(V.Malginov)*

1. T-100-X (first design)
2. T-100-Y (a.k.a. SU-100Y)
3. "Object 103"

REFERENCES:

[Specification of Soviet tanks](#)

[Specifications of Soviet tank guns](#)

Translated by:
[Krzysztof Pawlowski](#)

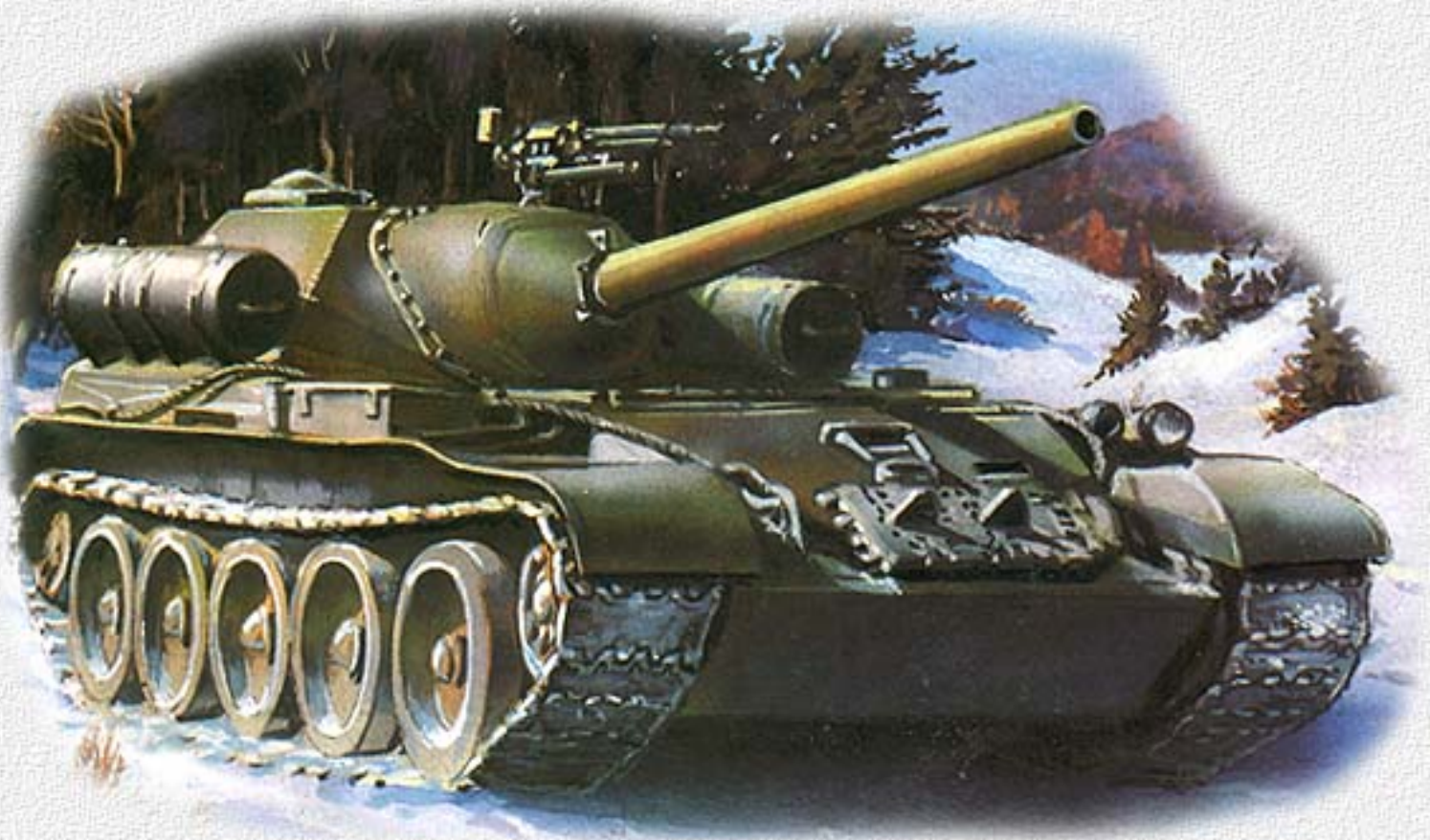
Sources:
M.Kolomiets, I.Moshanskiy "Mnogobashenniye Tanki RKKA" Fr. Illustratsiya #5, 2000
I.Pavlov, M.Pavlov "Sovetskie Tanki i SAU 1939-1945", Moscow, 1996.

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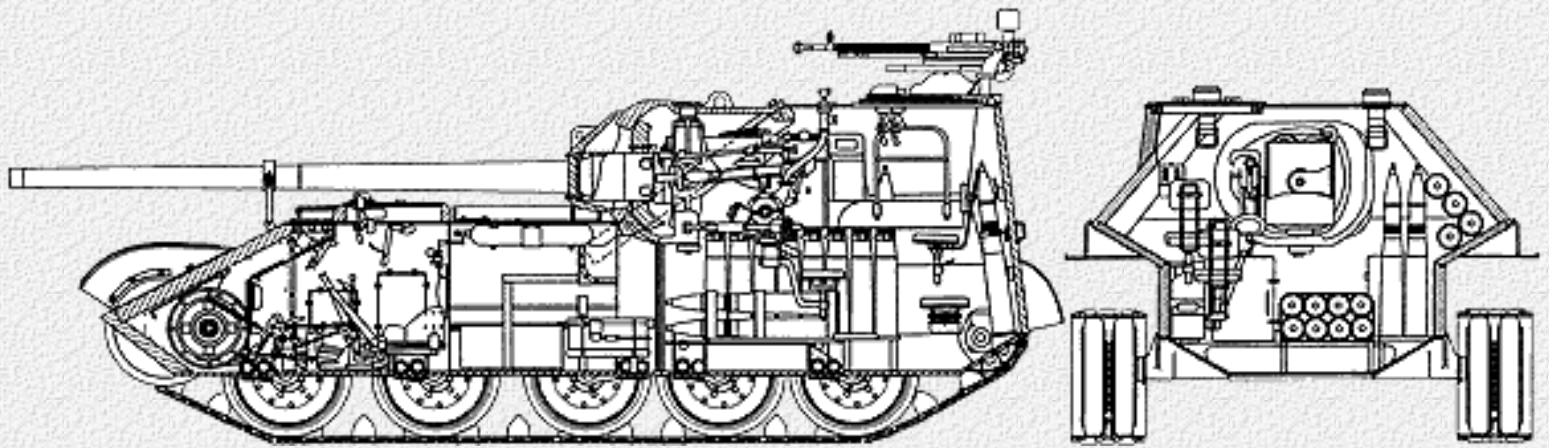


The SU-101/SU-102 Self-Propelled Gun

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In autumn 1944, production of a new mid - weight self-propelled gun, designated [SU-100](#), with the D-10S 100mm cannon was started at [UZTM](#) (also known as *Uralmash*). Within its class, the vehicle was manoeuvrable and well protected, with 75mm thick sloped frontal armour. (For comparison: the [SU-152](#) heavy assault self-propelled gun was also protected by 75mm thick frontal armour). In spite of this, there were some shortcomings common for vehicles with crew compartments located at the front. The long gun barrel increased the overall length of the vehicle. The projection of the barrel outside the hull made manoeuvring in the confined areas more difficult and limited the ability to drive across-country (due to barrel hitting the ground), and in wooded areas. The centre of gravity was transferred forward, which led to the overloading of front road wheels and consequently causing damage to the running gear and suspension. Finally, there was no satisfactory locking device to immobilise the barrel while on the move.



Cross-section of the SU-101 self-propelled gun

At the same time, improved armour protection on German AFVs called for an increase in firepower of Soviet tanks and SP-guns. This brought about the introduction of more powerful guns with longer barrels, up to the point where utilising the basic elements of [T-34](#) tank was no longer practical. A hull with a completely new layout was required.

In the summer of 1944, work on the new layout started simultaneously with production of SU-100 in the **UZTM**. By the end of 1944, N.V. Kurin, the designer, developed a number of basic designs for new SP-guns utilising hulls of all currently available Soviet tanks - as they were designed and also with redesigned the layouts.

In October 1944, the **UZTM** submitted five designs for review by Technical Council of **NKTP**:

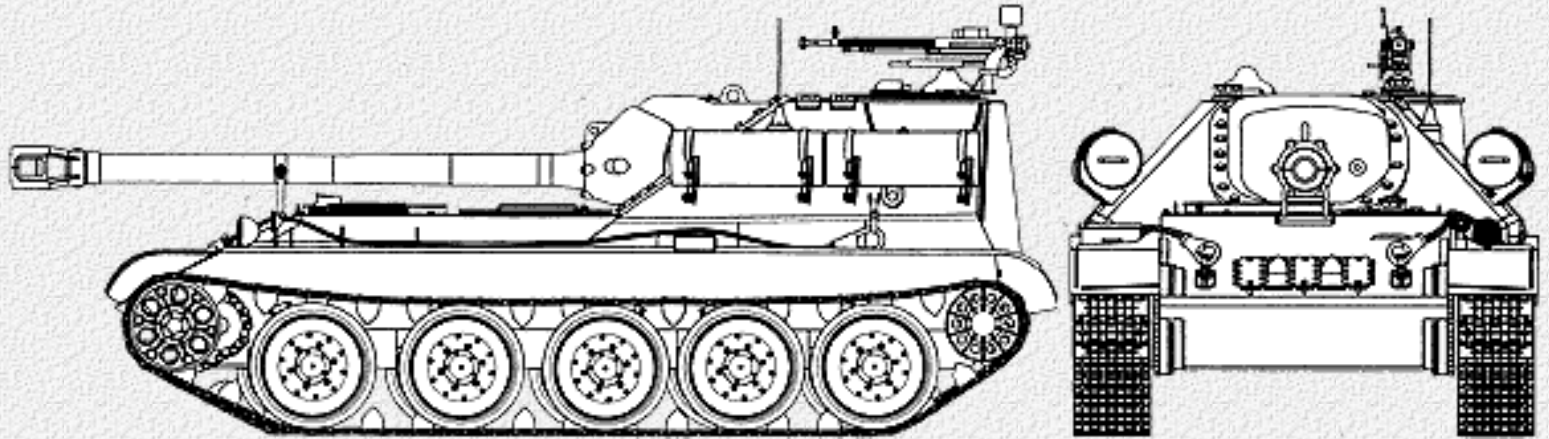
- [SU-122P](#), armed with the 122mm gun D-25S, at that time cast in metal and successfully undergoing plant trials;
- ESU-100, armed with the 100mm gun D-10S, with the crew compartment at the rear and electric transmission;
- SU-100-M-1, armed with the 100mm gun D-10S, fitted onto the hull of T-34 tank. The crew compartment was moved to the rear, whilst the engine and transmission unit were moved forward;
- SU-100-M-2, armed with the 100mm gun D-10S, based on the [T-44](#) tank with the crew compartment at the rear;
- SU-122-44, armed with the 122mm gun D-25-44S, utilising the hull and systems of the T-44 tank and having the crew compartment in the front.

The Technical Council considered the SU-100-M-2 and SU-122-44 as the best. By Decree #625, of the **NKTP** 26th October 1944, **UZTM** was to complete the design, prepare workshop drawings and manufacture experimental units of the SU-100-M-2 and SU-122-44.

In December 1944, whilst undertaking detailed design work on the SU-122-44, it became obvious that, due to the 5 metre long barrel, its weight and dimensions were excessive. At the same time, the SU-100-M-2 with a crew compartment at the rear, was shorter in

length and the total weight, including increased armour, was in line with other vehicles of its class. Based on the results, it was decided to proceed with work only on the SU-100-M-2, whilst work on the SU-122-44 was halted by the Directive #107 of the **NKTP** dated 7th March 1945. The same directive allocated the name "Uralmash-1" and set the date of 1st May 1945 for the first trial unit to be ready.

It is worth mentioning that the "Uralmash-1" design SP-gun was prepared by the design section of **UZTM** headed by L. Gorlitskiy in August 1943. However, it was not approved by the **NKTP** and was left "frozen" for a while.



SU-102 self-propelled gun

A.M. Lehtcind, I.I. Emmanuilov, A.G. Gaivaronskiy, G.F.Ksyunin, I.F. Vakhrushev, L.A. Pinus, E.A. Karlinskiy, E.I. Linkov, D.A. Geriev, V.L. Likhomanov, N.N. Efimov, A.D. Nekhludov and others contributed to the design, and the head designer was L.I. Gorlitskiy.

During March and April 1945, the two experimental vehicles were completed. One, designated SU-101, had the D-10S 100mm gun, the other, SU-102, was armed with the D-25S-44 122mm gun. By the end of the Great Patriotic War, these two units and one unarmed hull for testing the armour protection were completed.

The "Uralmash-1" was an example of the SP-gun with a fully enclosed crew compartment at the rear and power/transmission unit at the front. In contemporary documents, it was often named as "of Ferdinand type".

The hull of the SP-gun was made of welded rolled steel plates sloped to increase protection. The thickness of the hull front plate was 90mm at an of angle 27°; the crew compartment was protected by 122mm thick plate set at an of angle 35°. Side armour was 75mm thick, while rear armour plate was 40mm thick. The plates of the hull and crew compartment were combined at the rear. On the right side, there was a square armoured hatch. In the top of crew compartment, there was a circular rotating hatch fitted with a commander's observation sight.

The D-10S gun was fitted in the solid mantlet in front plate of the crew compartment The barrel overhung the hull by 630 mm. The gun could be elevated between +18° and -2° in



SU-101 in Kubinka museum. (V.Potapov)

vertical plane, and traversed 22.5° . Thirty-five fixed ammunition rounds were provided. A telescopic sight TSh-19 and panoramic viewer were installed. The 12.7mm anti-aircraft machine-gun DShK, with 450 rounds, was mounted near the top hatch.

The V-2-44 engine was located lengthways, in the front and to the right of the hull. The driver was situated on the left side.

The transmission system

was borrowed from the T-34 tank, though a few changes were introduced. The torsion bar suspension was adopted from the T-44 tank. The drive sprocket was used from the T-34 tank. With a weight of 34.1 tonnes, the SP-gun was able to reach speeds up to 54 km/h. There was a four man crew.

For outside communication, the 9-RS radio was provided and internally TPU-3bisF. The vehicle was also provided with a signal system and intercom linking the commander and driver.

The SU-102 differed from the SU-101 by having a D-25S-44 122mm gun with a vertical elevation of between $+18,5^{\circ}$ - $0^{\circ}24'$, it could be traversed 19° . Due to the small size of crew compartment, the ammunition complement was only 28 fixed rounds (compared to the D-25 gun for [JS-2](#) or [JSU-122](#) which used two-piece shells). The weight increased marginally to 34.8 tonnes.

In the summer and autumn 1945, factory trials of both vehicles took place. Some installations had to be adjusted or changed, in particular ventilation and engine cooling systems. The temperature in the driver and crew compartments was high, and as a result the driver's station had to be relocated. As a result of concentrated efforts by designers and fitters, the two experimental vehicles were made ready for field tests.

The "Uralmash-1" SP-guns were superior to any other Soviet SP-guns. The new layout allowed them to make it more compact, improved manoeuvrability and drivability in rough terrain. Safety of the crew was enhanced with the provision of the rear hatch. Armoured protection was better due to the compact layout. High points were scored during field trials with artillery fire. According to the Special Commission report, the overall armour



SU-101 in Kubinka. (V.Potapov)

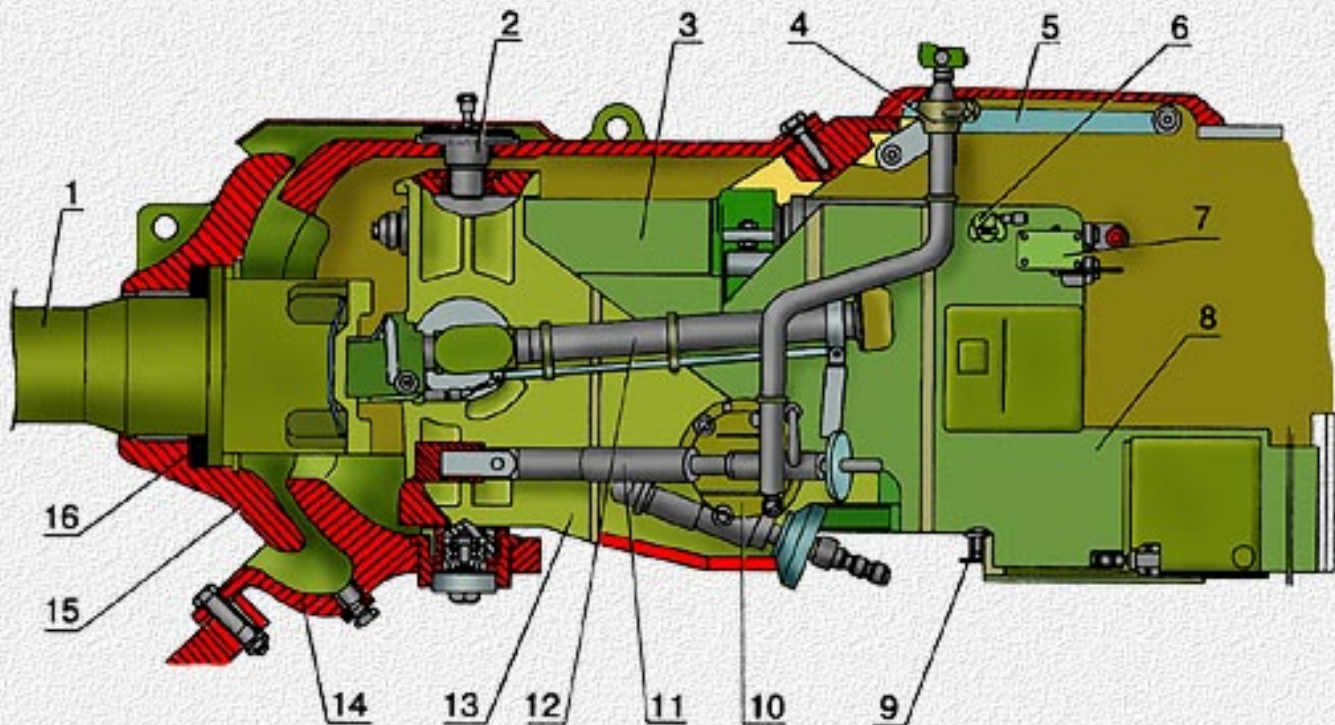
protection of "Uralmash-1" proved better than armour on any other Soviet tank and SP-gun, including the JS-2 and [JSU-152](#)! Equal load distribution on the road wheels reduced wear and tear. The location of the crew compartment to the rear, allowed the mounting of a very long barrelled cannon such as D-10 or D-25.

On the negative side, the crew compartment was smaller than in the SU-100

and, despite improvements introduced to engine cooling system, conditions for the driver were extremely hard, and in hot days unbearable! Gunfire affected the integrity of the crew compartment top plate, especially in the SU-102.

Both SP-guns hurriedly passed their tests and were recommended for acceptance into service. Nevertheless, they were not accepted. There were many reasons, the end of the war, demobilization, and an excessive number of already manufactured SP-guns. However, I believe the main reason was the introduction of the T-54 tank with its 100mm gun, that led to termination of work on "Uralmash-1".

At present, an SU-101 is displayed in the Military Historical Museum of Tank Arms and Technology in Kubinka.



The 100 mm D-10S Tank Gun

- | | |
|-------------------------------|-------------------------------|
| 1. The barrel; | 9. The firing lever; |
| 2. The upper journal; | 10. The elevation mechanism; |
| 3. The recoil brake; | 11. THE traversing mechanism; |
| 4. The Hertz panorama; | 12. The TSh-19 sight; |
| 5. The gun's holder; | 13. The frame; |
| 6. The elevation level; | 14. The casing of a chassis; |
| 7. The electric block detent; | 15. The gun's mantlet; |
| 8. The protection; | 16. The shock-absorber. |

REFERENCES:

[Specification of Soviet tanks](#)

[Specifications of Soviet tank guns](#)

[SU-101 blueprint](#) (216 Kb)

[Blueprint of the armoured hull for the SU-101](#) (102 Kb)

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Sources:
"Modelist-Konstruktor" #2, 2001;
S.Gryankin "The T-44", a historical issue of the "Tankomaster"
M.Baryatinsky "Soviet tanks of the World War Two", 1995

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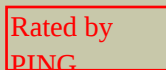
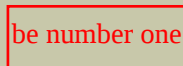
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